

AD 654996

SELECTIVE DISSEMINATION OF INFORMATION (SDI)
VOLUME II
IMPLEMENTATION MANUAL

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SELECTIVE DISSEMINATION OF INFORMATION (SDI)
VOLUME II
IMPLEMENTATION MANUAL

Army Technical Library Improvement Studies (ATLIS)
Report No. 16

13 June 1967

Prepared for

U. S. Army Natick Laboratories
Natick, Massachusetts 01762

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80 Main Street
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ABSTRACT

This document is a manual and set of guidelines for implementing and operating a replica of a prototype SDI system tested at U. S. Army Natick Laboratories. A complete description of the features of the SDI system and a history of the pilot test are given in Volume I of this final report entitled, Selective Dissemination of Information (SDI), Volume I, Pilot Test at U. S. Army Natick Laboratories. Volume II supplies information which is especially useful in the initial stages of implementation. It discusses the application of specific criteria for selecting an initial set of participants in the SDI program and gives guidelines for analyzing document input, indexing vocabulary and internally and externally produced machine-readable records that might be used as preferential or additional input. Two sections of the manual are devoted to giving specific directions to library and data processing personnel which are necessary for operation of the SDI system.

FOREWORD

This manual is intended primarily to be used as a set of specific directions for setting up a replica of the prototype system tested at Army Natick Laboratories. The information supplied in the manual, however, can be used as a general set of guidelines for implementing an SDI system of any type or description. The manual can be applied as a general set of guidelines because it treats many of the problems which are common to implementing a wide variety of systems for selectively disseminating information. Section II of the manual deals specifically with the problems that are encountered in the initial stages of systems implementation. This section outlines the coordination of four parallel efforts which lead to the selection of an initial set of participants and appropriate information input, a vocabulary for indexing documents and subscriber profiles, and a method of determining the applicability of using externally produced machine-readable document data. Sections III and IV describe the exact procedures to be followed in operating the SDI system which was pilot tested at Army Natick Laboratories. Wherever features of this system are optional, alternatives are described so that individual implementers can interject modifications in response to local requirements.

Volume I of this report describes the pilot test of this SDI system conducted at U. S. Army Natick Laboratories. It is designated Army Technical Library Improvement Studies Report No. 15 of May, 1967. Although Volume II is written to stand as a separate document, some of the descriptions, comments, and recommendations in Volume I may be valuable as additional information. This SDI system was designed in an earlier phase of the contract and described in a separate report available from Defense Documentation Center as AD 636916 entitled, Selective Dissemination of Information: Review of Selected Systems and a Design for Army Technical Libraries, August, 1966.

This final report was prepared for the ATLIS Program under the direction of Mr. Robert Martin, Chief Librarian, Army Natick Laboratories, Natick, Massachusetts. All work was performed by Information Dynamics Corporation, 80 Main Street, Reading, Massachusetts, under contract DA-19-129-AMC-957(N).

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I. INTRODUCTION

A. GENERAL INFORMATION FLOW AND PROJECT ORGANIZATION

Figure 1, Information Flow Patterns, shows the basic organizational constituents of an SDI system and the type of information which flows from one constituent to another. In essence, this manual describes methods and procedures for initiating this flow of information and for increasing and maintaining the information flow until it reaches an optimal rate in terms of the library's capacity to maintain it and the user's capacity to absorb it.

Even prior to initiation of an SDI project, information has been flowing from the user to the library which describes, in broad terms, the general interests of potential SDI users. This information comes in the form of the record of the use made of library materials (which can be obtained through circulation statistics) and also the publications authored by potential users which in most cases the library is responsible for cataloging into its archival collection of in-house publications. Although this information may not be in a form readily amenable to analyses for purposes of SDI project initiation, procedures can be adopted for measuring and evaluating this stream of information which will ultimately be valuable during initial stages of project start-up.

Information is also flowing from the library to the user in terms of the services offered by the library and the tools created by the library for use by the patron in identifying the bibliographic units collected for the patrons' use. Most often these take the form of a card catalog to which the user may gain access by main entry, title, subject, and other tracings. Although a formal subject authority list may not be available to the user as a separate library document, the user may already be familiar with the terms customarily used in describing information of particular interest to him which the library may contain. The library may also publish an accessions list announcing recent acquisitions through which the user may have gained some familiarity with the types of materials collected by the library. Through the library's reference service, some users may already be familiar with the information exchange process that must take place in the course of answering reference questions and preparing specialized bibliographies. In some installations, these procedures may have already been formalized in order to expedite the answering of reference questions through a mechanized retrieval program.

Thus, even before SDI project initiation, an information flow pattern is already operating. The library learns of the user's interests by noting the kinds of information requested and the kinds of publications authored by its users, and the library patron becomes familiar with the terms which the librarian uses to describe the information in which he is interested through

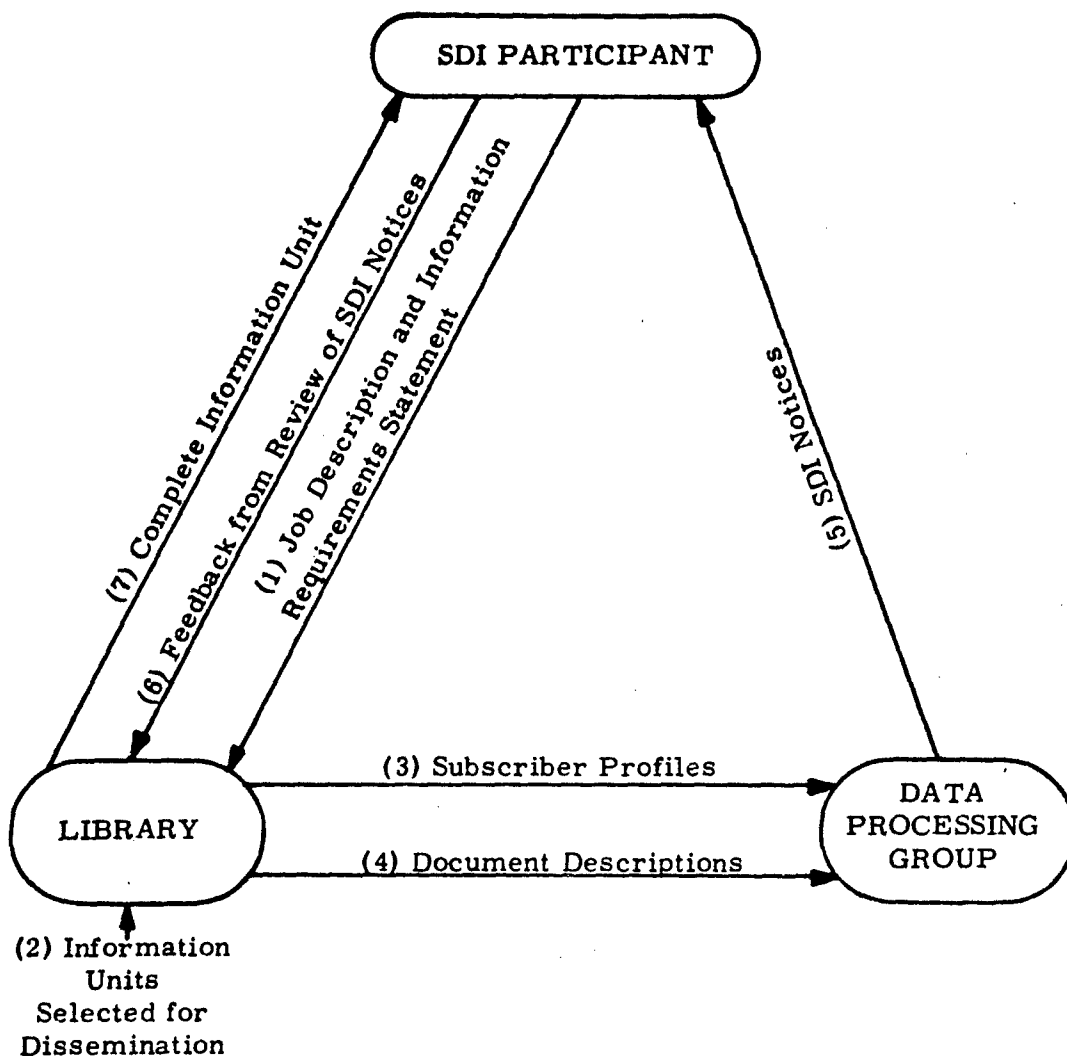


Figure 1 SDI Information Flow Patterns

the vehicle of the library card catalog and the reference services rendered to him in the past. The initial phase of the SDI program is merely a formalization and intensification of this characteristic interplay of information between library and user.

As shown in Figure 1, the user is an integral part of the SDI information flow pattern, which takes the form of a loop. The three major elements of the loop are the user himself, the library, and the information and data processing group. At project initiation, the user describes his interests to the librarian. This most often takes the form as a verbal description of the project in which the user is involved and the types of information which the user might use in solving problems. The librarian uses this information to select input to the SDI system and to describe the items selected in terms which have a high probability of matching one or more user interests. Both user interest profiles and documents described through the system vocabulary are transformed into machine-readable form by the information and data processing group. At the conclusion of the transformation process the user interest profile and document descriptions in machine-readable form are matched by computer. The output of the matching process is a set of directions to the processing group which tells it what information should be sent to which individuals. On receiving the information, the user evaluates it and indicates the results of his evaluation by feeding back information to the librarian. This completes the SDI information loop, often termed an SDI cycle.

The SDI cycle is perpetuated by the librarian who re-evaluates the terms used to describe the user's interests. Each user interest profile is adjusted to reflect the clearer understanding of the user's interest obtained by means of the feedback from the user's evaluation of information sent to him in the previous SDI cycle. Reprofileing is the most critical aspect of SDI because it acts as a very delicate control on the volume and relevance of the information flowing in the SDI loop. If user feedback is evaluated properly, the user will ultimately obtain a stream of information which is tailored to his specific interests and information absorption capacity. Misinterpretation of the signals fed back from the user to the librarian results in an erratic and often inappropriate information flow pattern.

The user, the librarian, and the information and data processing group constitute the three nodes in the SDI information loop. Initially, information flows from the user to the library in the form of a description of user interests. The librarian applies this information in the selection and indexing of documents for input to the SDI system. Coded user interest and document descriptions are provided to the information and data processing

group which matches the two descriptions through a mechanized procedure. Output of the mechanized matching process is used for routing information to the users who feed back their evaluation of the information to the librarian. The next sections in this manual enlarge upon the functions performed by each of these nodes and, in particular, the functions of the library and the information and data processing group.

II. SDI PROJECT INITIATION

As intimated in the above simplified description of an SDI system, project initiation must begin with an analysis of the information which is already passing between the library and the user. Much of the groundwork for establishing an SDI system can be accomplished through an analysis of the types of information generated or requested by the user. This must be accompanied by a systematic study of the types of information which the library collects that are amenable to dissemination. A careful study must also be made of the indexing tools which the library presently uses to index the collection. To aid in system start-up, information may already be available in a suitable form for dissemination from machine-readable records previously produced by the library or from records produced externally. Of necessity, these four studies must be conducted concurrently so that the results of each study will contribute to a greater understanding of the possibilities and limitations which are existent at the time of project initiation.

A. ANALYSIS OF USER INTERESTS

The purpose of this initial study is to lay the necessary groundwork for selecting the most appropriate set of initial participants. Most likely this study will not produce a usable interest profile for any single potential SDI participant. The objective of the study should rather be to eliminate those interests which the library, at the present time, is least likely to satisfy through operation of an SDI system. Since the ultimate success of the SDI system depends to a great measure on a favorable start, the analysis of user interests should lead to selection of a set of participants which increases the likelihood of an early success. Once the system is established, the information input and indexing methods can be geared to handle the more sophisticated needs of additional users.

1. Utilization of the Record of Use Statistics

The fact that a person already relies heavily on the library to satisfy his information requirements makes the user a likely candidate as an initial participant in the SDI system. First, the library staff is already acquainted with this user's information requirements, and second, the user is already familiar with the methods used by the library staff in collecting, indexing and supplying information. An already existing information flow pattern enhances the likelihood of a complete communication of a user's interest in the process of establishing an initial interest profile.

Most of the heaviest library users will already be known to the library staff by name through long established communication patterns. Without even referencing library records, reference and circulation personnel can probably identify a nucleus of potential SDI users. This nucleus

can be enlarged by reference to circulation and service files. Most libraries file circulation records by borrower's name so that circulation statistics are readily available. Those users to whom large numbers of documents are already on loan are likely candidates for initial profiling. The circulation records themselves can be used as an initial basis for structuring a starting profile that can be amplified through personal interview.

Records kept on previous reference services are also a valuable source of information on user interests. With the advent of mechanized searches available through various Government agencies, such as DDC and NASA, many libraries which utilize these services for their patrons maintain records of the relevancy of retrieved citations on the basis of feedback from requesters. This information is more directly usable in guiding the selection of initial participants since it more closely defines the exact interests of the requester. In reference work, the user is given more opportunity to convey the details of his work and information requirements. Thus, although less numerous than records on circulation, reference questions are a more valuable source as an indicator of user interests. In some instances, the final version of a first profile will closely approximate the form of the user's last reference question.

A four-pronged approach should be used in initiating an SDI project. The starting point should be an analysis of already available indications of user interests. Such indications can be obtained from circulation statistics and records of past reference questions. This approach is especially facilitated if the library already maintains circulation records filed by borrower's name and records of each user's evaluation of citations retrieved from extensive information files, such as those maintained by NASA and DDC.

2. Analysis of the Form DD 1498 Project Descriptions

By military regulation, each formal project is required to submit a full project description on Department of Defense Form 1498. The description consists of the name of the project director, security classification of the project, a textual description, descriptive terms selected from the Defense Documentation Center thesaurus and administrative information. If proper need-to-know can be established, this information is available through command channels or through Defense Documentation Center, which maintains an up-to-date copy of each project description.

The information contained on the Form DD 1498 is primarily valuable for identifying communities of similar interests within the large

community served by the library. Since the information serves a wide and varied audience, it cannot be expected to serve the specific function of an SDI profile.

Some of the terms already selected to describe the project might be directly usable in an initial SDI profile, if these terms are compatible with those already incorporated in the subject authority used by the library. The information is most useful when coupled with information already obtained from the circulation statistics and reference request records. Coupled with these other elements, information on the Form DD 1498 may contribute to a more complete understanding of users' interests.

3. Analysis of Internal Publications

The analysis of publications authored by library users is a rather erratic indicator of user interests. Because of the time lag between project initiation and publication of results obtained, the publication itself is likely to represent an outdated user interest. In fact, the publication is likely to be a milestone which marks a significant change in the user's interests, since it usually indicates the end of a project. Also, an individual is likely to produce a relatively small number of reports and journal articles within a single year. Thus, analysis of internal publications can be used more appropriately as an indicator to reinforce the information about the user's interest obtained from other sources.

4. User Field of Interest Survey

A direct approach to ascertaining user interests is to perform a formal survey by means of a preprinted questionnaire. The success of this method depends upon the care and skill in preparing and formatting of the questions. Those who are experienced in structuring such a questionnaire could expect to obtain valuable information required for initial selection of participants. Indeed, the results of such a survey may already be available in connection with other library information projects. Surveys may also have been taken for other purposes by the personnel department in connection with a manpower survey. As in the case of internal publication analysis, however, survey results may be useful only to reinforce information obtained through record of use statistics analysis and the knowledge obtained through direct service to the user.

The most frequent use of the field of interest survey is to ascertain the degree of use of various library services and types of information collected. Thus, the results of a survey might better be applied to

the selection of materials for dissemination rather than selection of initial participants. This aspect is covered in subsection B below.

5. Selection of Initial Participants

The ultimate goal to be attained in selection of initial participants is to maximize success of the initial stages of the project. This strategy calls for minimizing any problems that might be encountered and presupposes an understanding of the type of difficulty that might be encountered in the first phase of implementation. Two factors which must be given careful consideration are the amount of information in terms of input volume per unit time that is available for dissemination to an individual and the availability of suitable index terms for document and profile description. For this reason, these two considerations must be investigated concurrently with the selection of an initial set of participants. Thus, the results of the analyses detailed in subsections B and C below should be available with the results of the analysis discussed in this section. Failure to perform these analyses concurrently may lead to a participant obtaining no selections during the first few SDI cycles, since no information has been collected which might be of interest to that individual. Thus, a reprofiling stalemate may result because the user cannot provide feedback to the system because the system does not provide him information.

Initial participants should be selected on the basis of the following factors:

- ☆ Heavy utilization of the library collection prior to SDI project initiation
- ☆ Satisfaction of the user with the present information resources of the library
- ☆ Rapport between the user and the library reference personnel
- ☆ Reference personnel degree of understanding of the user's information requirements
- ☆ Amount of information already available on the user's information acquisition habits, and
- ☆ Indexing terminology suitable for profile and document description.

Following these guidelines will assure that sufficient information will be available for dissemination to the user, that the user has sufficient motivation to participate effectively in SDI start-up, and that interests of the user can be understood and correctly indexed by the profiler.

B. ANALYSIS OF INFORMATION RESOURCES

Any information which the library collects for use by the patron might be used as input to an SDI system. However, some types of information are more suitable for use in the SDI start-up phase than others. Selection of input materials should be based on four factors: (1) degree of match between information content and information requirements of the users, (2) the user's evaluation of the value of information usually supplied by that type of publication, (3) volume of input per unit time, and (4) availability of an identifiable extract.

Primary emphasis should be placed on the degree of match of the subject matter to the information requirements of potential users. Since the initial phase of SDI implementation can only incorporate a limited number of users, the information input should, to the highest degree possible, correspond with the interests of these users. If material is not preselected for the initial user group, the processing of many information units might result in a relatively small number of matches between the processed units and the users. Preselection of input should thus be considered during SDI start-up to avoid a major expenditure of effort resulting in a relatively low yield.

Since the SDI system is cyclical, the volume of input for any given subject area must be sufficient to support subsequent SDI cycles. The input volume problem can be reduced by lengthening the time between cycles. This solution, however, is only effective within certain ranges. Certainly six months between cycles would be ineffective since the communication channels between the user and the library would deteriorate. SDI cycles should be timed to accommodate information input rate as well as to retain a high level of user interest. Additional criteria are discussed under the separate headings of journal, technical report and book collections.

1. Journal Collection

Journals can be grouped into three categories -- trade, technical, and abstract. Abstract journals usually cover a complete range of literature not limited to other technical journals. Several Government agencies, such as Defense Documentation Center, NASA, and Clearinghouse for Scientific and Technical Information, publish abstract journals which

cover Government research reports. Many societies also publish abstract journals which cover primarily the book and journal article literature.

Of the three kinds of journals, the abstract journal is most convenient for providing input to an SDI system. Within each journal the abstract is printed in a stylized format which can readily be extracted for reproduction on the SDI notice card. Usually the title and descriptive information is printed in bold or italic type faces and can be readily identified by a keypunch operator. This disadvantage to the abstract journal is that the information provided may be slanted by the abstractor so that accurate assignment of descriptive terms is not feasible. Another disadvantage is that the full article itself is not immediately available for reproduction and distribution on request. This problem is somewhat lessened when the library journal collection is large and the articles abstracted are primarily represented by articles in the journal collection on hand.

Trade journals provide the least valuable input to an SDI system. Many of the articles which purport to be technical in nature are really news releases from various companies who have products to sell. Since these product announcements appear widely in other news media, such as flyers and technical newspapers, the information is of little value to one who already keeps himself informed. Trade journals are primarily important as a source of product surveys and comparative product reviews. Since trade journal articles are not prefaced by an abstract in most instances, the indexer must select the most significant portion of the article for dissemination.

The technical journal collection can provide the largest single source of original input information. Frequently, technical journal articles are headed by an easily extracted informative abstract. Technical journals are also of greater interest to the user since they are his most frequent source of information.

2. Technical Report Collection

The technical report collection could represent an information input of equal importance to that of journals. If the technical report is generated for or by a Government agency, the report usually contains an abstract which appears in the report itself and in a Government-published abstract journal. Some of the abstract journals also print subject terms which have been assigned for mechanized information retrieval by the Government agency. The presence of both the abstract and index terms greatly facilitates input processing.

3. Book Collection

Books represent the least amenable form of input to an SDI system. Because of the broader subject coverage of a single book, it is difficult to obtain a meaningful abstract and set of index terms to describe the book. Also due to the characteristics of the book publication cycle, the information contained in the book has often appeared in other media such as journals and technical reports. If books are included in an SDI system, information printed on the cover fly sheet often provides information suitable for dissemination.

4. Copy Generation

One of the key factors in the selection of input materials pertains to the facility with which the user can be provided with his own personal copy of the full information unit. Government research reports lend themselves most readily to this aspect of SDI. Many Government agencies provide a copy service so that the library does not have to assume the burden of copying individual research reports. Some agencies provide a master copy of the report on microfilm or microfiche. The library has the option of distributing microcopy or full-size hard copy generated from the library microcopy.

Reproduction of journal articles and portions of books might present a real work load problem to the library should it wish to provide full-size copy in response to the SDI participant's request. This factor should be considered in selecting journals and books as input to the SDI system. Some of the journal literature may be available in reprint or photocopy form from the publisher or abstracting services, such as the American Institute of Aeronautics and Astronautics. In selecting abstracts for dissemination, the time lag between request and hard-copy delivery is also a consideration. When the article represented by the abstract is not part of the journal collection, then a delay is introduced in obtaining the full article when requested.

C. VOCABULARY ANALYSIS

Indexing vocabulary is the single most important aspect in the implementation of an SDI system. Since the matching of document descriptions against user interests is accomplished via the vehicle of a vocabulary term, the system can be only as successful as the vocabulary will allow. If the library does not already have a subject authority which has been found successful in reference work, then steps must be taken prior to subject initiation to develop this tool.

1. Survey of Presently Used Vocabulary

For SDI use, subject terms or classification schemes should fall in the middle ground between that which might be used as the basis for retrospective information retrieval and that which might be used for grouping information for announcement purposes, such as in an accessions list. If the vocabulary structure is too coarse, the SDI participant will obtain too much information. If indexing terms are too specific, the user will obtain very little information or information which is irrelevant. The latter case may arise because the user attempts to increase the volume of information coming to him by requesting assignment of additional peripheral terms to his profile. As the number of terms in a profile increases, the chance for false coordination of terms also increases, so that a higher percentage of irrelevant information is obtained.

There are no set rules for predicting whether a subject authority already in use is suitable for SDI purposes. There are certain criteria, however, which can be applied in the analysis of any subject authority tool. One of these criteria is the absence of synonyms, which is a desirable characteristic of any subject authority. Another criteria is the presence of abundant cross references to facilitate selection of the most appropriate set of index terms to describe the information.

2. Survey of Vocabulary Used by Other Systems

If the library does not currently have a controlled vocabulary in use, the vocabularies used in other systems may be applicable. Many information retrieval systems currently operating have published thesauri, glossaries, and other term lists which are available on request. Selected parts of these controlled vocabularies can be used as a nucleus for creating a controlled vocabulary for the SDI system. To derive a usable tool, however, a substantial effort is required to segregate applicable terms, eliminate synonyms, and create a cross-reference framework.

3. Creation of a Nucleus Vocabulary

To keep the vocabulary problem within reasonable bounds during the initial stages of implementation, SDI participants and information input should be carefully selected so that maximum utilization can be made of already existent subject authority tools. Thus, if the vocabulary is strongest for a particular discipline, both participants and information should be selected so that the major portion of indexing can be accomplished by means of the existent vocabulary. Although vocabulary can be developed as the SDI

system is used, a nucleus vocabulary must be in existence for indexing the first user profiles and information input. If effort must be expended in developing an initial set of indexing terms, then the effort should be confined to a narrow subject area so that results will be complete and lasting. Attack over a broad front leads to diffusion of effort. Initial success is more likely if concentrated effort is expended in the satisfaction of a narrow subject area of a limited number of participants whose interests can be accurately represented by the nucleus of indexing terms at hand.

D. UTILIZATION OF MACHINE-READABLE RECORDS

In some instances machine-readable records are already being produced as a product of the operation of other information services. Machine-readable records are also available from external sources as either a paid service or cooperative plan.

1. Machine-Readable Records Produced by the Library

If the library currently uses a computer to support an information retrieval service and produce printed bibliographic outputs, then it is likely that the information put in machine-readable form can be used in an SDI system. In fact, the SDI system should be incorporated as an integral subsystem of the present one. If plugboard program equipment is presently being used with punched card or punched paper tape input, then the development on the SDI system can be a separate undertaking requiring only minimal coordination with the ongoing system. The SDI system can make independent use of presently-generated punched card and punched paper tape information and can be programmed to ignore the control codes necessary to plugboard programming.

If punched cards are presently used, the important consideration is that each term describing a document appear on a separate card in a fixed field. If this condition is met, only minimal changes need be made in the computer programs described by this manual.

2. Machine-Readable Records Produced by Other Systems

The processing of machine-readable information generated from external systems is a possibility that should not be overlooked in setting up an SDI system. The problems that arise, however, are not trivial and require extended effort for their solution. This is especially true if an effort is made to process externally generated information within the confines of a previously established internal system. The prospective

user must understand the format of the machine-readable input. This understanding must include an awareness of the function of each data element in the record and the possible ranges that each data element can assume. Sample data formats are given for the MARC data tape in Figure 2 and the NASA data tape in Figure 3. These are extracted from texts which describe respectively the data formats and computer programs available from the Library of Congress and the National Aeronautics and Space Administration.

Before extensive effort is expended in utilizing any externally-produced records, the ultimate utility of these records should be carefully investigated to determine how closely the information content corresponds with the information requirements of the system's users. Further study should be conducted to determine whether the information should be processed into the currently operating system or whether the agencies providing the data tapes can also provide computer programs usable on the present data processing configuration.

A = alpha
N = numeric

X = alpha "X"
bl = blank

B = bit pattern

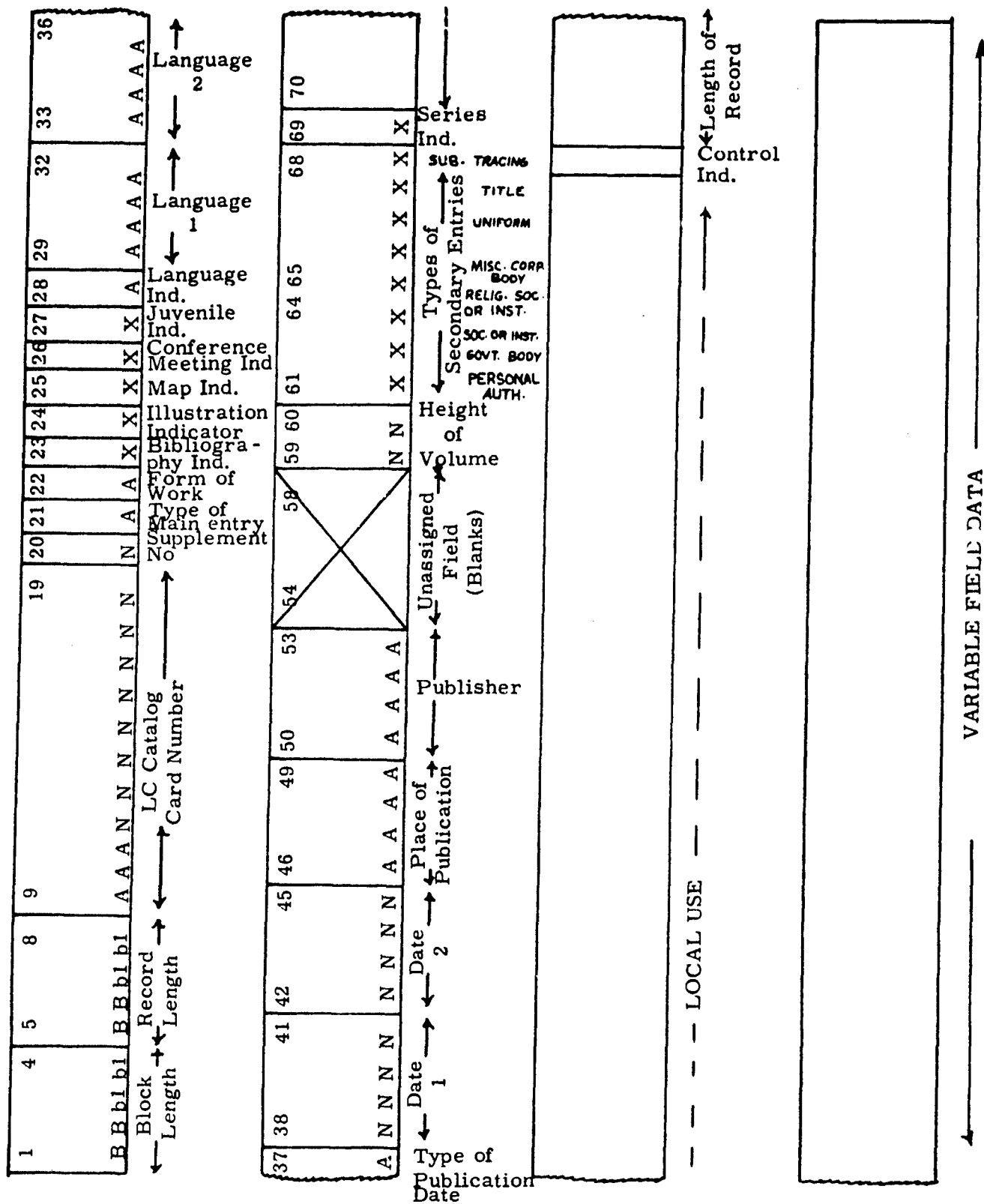


Figure 2 Machine-Readable Catalog Record Format from MARC Program

Part 2—Storage: The Data Base

NASA LINEAR FILE-1410 MODEL II

September 1, 1955

[illegible]

SCHEMATIC OF RECORD ORGANIZATION

SYMBOLIC	SLIDE NUMBER	RECORD #1	RECORD #2	ING	SLIDE TYPE	RECORD #3	RECORD #4	RECORD #5
DATA			3000 per inch				3000 per inch	
LOCATION								
WORD MARK								

Figure 3 NASA Linear File Format and Schematic of Record Organization

III. LIBRARY FUNCTIONS

Library personnel perform three distinctive functions in the SDI system. They prepare information for dissemination, including subject indexing and abstracting or extracting; they index the information requirements of users; and they control the system's vocabulary. Normally, library personnel will not be engaged in the data processing aspect of systems maintenance, since these will be carried out by personnel associated with the computation and data processing center which supports the library and other organizations.

A. VOCABULARY CONTROL

The user of this system has the option of carefully controlling the content of the system's vocabulary. This vocabulary is a set of terms from which individual terms are selected for indexing user interests and documents. Normally, it is advisable to control the input of new terms to the vocabulary so that the chance of adding synonymous terms is minimized.

Control of the glossary is facilitated by operation of the glossary computer program which performs three functions. By means of the glossary program, new terms are added to the system's vocabulary. Terms describing both interest profiles and documents are compared against the system's vocabulary by means of the glossary program to ensure correct spelling on the basis of comparison with previously established terms. The glossary program also assigns a six-digit code to each document and profile term which is found in the glossary. The output of the glossary program is an updated listing of the system's vocabulary which gives the index term, its assigned code and the number of times the term has been used to index documents. Diagnostic comments are printed on the typewriter to indicate the reasons for rejection of input to the glossary program.

1. Preparation of a Glossary Worksheet

A glossary worksheet used for adding new terms to the system's vocabulary is shown in Figure 4. The same worksheet may also be used for indicating the deletion of a term. Each line on the form pertains to one vocabulary term. To add a new term, write J in column 1, a two-digit glossary number in column 5, a four-digit code number in column 6, and the term itself in column 7. The columns are marked by numbers within circles. Other numbers at the top of the form are for use by the keypuncher and can be ignored by personnel filling out the glossary worksheet.

The use of a glossary number allows for the separation of different kinds of terms in the system's vocabulary. For instance, a distinctive two-digit number could be assigned respectively to personal authors, corporate authors, contract numbers, report numbers, and subject headings.

[illegible]

Use of this program requires that each term also be assigned a four-digit code which uniquely identifies the term within a particular glossary. Codes must be assigned so that, when the terms within a numbered glossary are listed in alphabetical order, the assigned codes will be in numerical order. To establish an initial set of terms, the terms can be manually sorted, first by glossary number and, within glossary, by alphanumeric spelling. The sorted terms can then be listed on the glossary worksheet. Code numbers are assigned in increments so that new terms can be inserted at a later date. The spacing increment is obtained arithmetically by dividing 10,000 by 1, plus the number of terms to be coded. The increment itself is assigned to the first term on the list. Each successive code is obtained by adding this increment to the previous code. Thus, if three terms are to be coded, the increment would be equal to 10,000 divided by 4, or 2,500. The first term would be coded 2,500, the second 5,000, and the third 7,500.

To insert a new term between two adjacent terms in the already established term list, the same procedure is repeated for obtaining an increment, except the code numbers available for assignment are no longer 10,000 in total but rather the arithmetic difference between the codes already assigned to the adjacent terms. In obtaining the code increment, fractional remainders can be ignored or can be distributed evenly over the terms to be coded. The situation to be avoided in any case is the assignment of adjacent codes which differ only by one, since a new term cannot be inserted between the two adjacent terms without renumbering one or the other of the terms already coded.

There are few restrictions on formulating processable terms for inclusion in any glossary. The first character in a term must be either a number or a letter. All other characters in the term may consist of any sequence of numbers, letters, spaces, and the characters period, comma, hyphen, virgule, number sign, dollar sign, at sign, percent, asterisk, left parenthesis, right parenthesis, plus, underline, or equal sign. Terms may contain up to 60 characters and included spaces.

In arranging the terms in alphabetical sequence within a glossary, terms must be in ascending order by at least the first character, with the numbers 0-9 first and the letters A-Z next. The sequencing of all terms having the same first character is optional and may follow any sorting pattern desired by the librarian. In designing a sort sequence, however, due consideration should be given to the mechanical sorting characteristics of the sorting machine to be used. It would be logical to continue at least the convention that numbers always precede letters.

To delete a term from the glossary, write K in column 1 and write the glossary number, term code and term as it appears in the last glossary listing in columns 5, 6, and 7.

It is also possible to change the spelling of a term (if this does not involve the first character of the term) and the frequency of use. This may be done by writing J in column 1, glossary number and code in columns 5 and 6, and the desired frequency and term spelling in columns 4 and 7. Both columns 4 and 7 must be filled in, since these fields will replace the frequency and term as they appeared in the last glossary listing. If no change is required for the frequency or the term spelling, then these fields should be completed as they appeared on the previous glossary listing. It should be noted that any new spelling of a term cannot violate the concurrent sequencing of both code and term in the glossary listing. If such a violation would occur, then the change in term spelling must be accomplished by the creation of two separate transactions: one which adds the term with the new spelling, and one which deletes the term with the old spelling.

2. Interpretation of the Glossary Printout

For an interpretation of the glossary listing, refer to Figure 5, a sample glossary listing, and Figure 6, a tabular list of comments pertaining to the listing. The glossary listing, Figure 5, shows either the current status of the entire glossary or merely the changes which have been made to the glossary affected by the last input. If a full glossary listing is not desired, the printing of the listing can be suppressed by instructing the operator of the computer program to put sense switch #3 in the "ON" position. If the switch is OFF, a full listing will be printed which includes current transactions as well as the complete glossary status. When a term is deleted from the glossary, the term is listed with a minus sign in the K column of the glossary. The term, however, is deleted from the new magnetic tape created during the update cycle. It will not appear on the next glossary listing.

Two printed outputs are derived from operation of the glossary program: a glossary listing on the high-speed printer and an error listing on the on-line typewriter. The glossary listing actually consists of two parts, the glossary proper and a list of totals at the end of the glossary. Interpretation of the glossary columns and total line is given in Figure 6.

K FREQ CODE GL TERM

- * 0 0100 01 AEROSPACE CORP.
- * 0 0200 01 AMERICAN INST. OF BIOLOGICAL SCIENCES
- * 0 0300 01 NATIONAL CASH REGISTER CO.
- * 0 0400 01 STANFORD RESEARCH INST.
- * 0 0100 03 AF 04(695)-469
- * 0 0200 03 AF 33(615)-2405
- * 0 0300 03 DA-28-043-AMC-00318(E)
- * 0 0100 04 INTERNATIONAL INTERDISCIPLINARY CONF. PROC.
- * 0 0100 05 BALENGER J
- * 0 0200 05 CALDWELL R
- * 0 0300 05 CALLOWAY D
- * 0 0400 05 DOYLE G
- * 0 0500 05 HAYDEN W
- * 0 0600 05 IVAN W
- * 0 0700 05 JOYCE R
- * 0 0800 05 SWOPE R
- * 0 0048 07 ABLATION
- * 0 0096 07 ABRASION
- * 0 0144 07 ABRASION RESISTANCE
- * 0 0192 07 ABRASION RESISTANT COATINGS
- * 0 0216 07 ABRASIVE BLASTING
- * 0 0240 07 ABSOLUTE PRESSURE MEASUREMENT
- * 0 0288 07 ABSORPTION
- * 0 0336 07 ABSORPTION REFRIGERATION
- * 0 0384 07 ABSORPTION SPECTRA
- * 0 0432 07 ABSORPTIVITY

CONE	NONC	ADD	DEL.	MOD.	MISS	SEQ.	RAN
0	0	296	0	0	0	0	0

Figure 5 Glossary Listing

HIGH-SPEED PRINTER

Glossary List Column Headings

a. K - Transaction Key

+ Term addition; indicates that term has been added during this cycle; tally of number of terms added appears in total line under "ADD" heading; result of reading J1 card.

- Term deletion; indicates that term has been deleted during this cycle; tally of number of terms deleted appears in total line under "DEL" heading; result of reading K1 card.

X Term/frequency change; indicates change to term spelling and/or frequency of use; tally of entries changed appears under "MOD" heading in total line; result of reading J1 card.

space Glossary term; term printed from glossary file; printing of glossary terms can be suppressed by setting console switch #3 in its "ON" position.

b. FREQ Frequency of use; incremented by one for each document indexed by the term; tally of document terms coded shown under "CODE" heading of total line.

c. CODE GL Glossary number and code assigned to term.

d. TERM Retrieval term

Total Line

a. CODE Number of document (J2) and subscriber (J3) term cards coded and recorded on the transaction tape during this cycle. For every J2 card coded, the frequency of use (FREQ) of the respective term is incremented.

Figure 6 Interpretation of Glossary Program Listings

Total Line (Cont'd)

- b. NONC Number of document and subscriber cards requiring no coding which were recorded on the transaction tape during this cycle. Any card having a 1, 2, or 3 in column 1 does not require coding from the Glossary File.
- c. ADD Number of terms added to the glossary during this cycle; number of terms marked "+" on Glossary listings incremented for some J1 cards processed.
- d. DEL Number of terms deleted from the glossary during this cycle; number of terms marked "-" on Glossary listing; incremented for each K1 card processed.
- e. MOD Number of terms and/or frequencies of use modified during this cycle; number of terms marked "X" on Glossary List; incremented for some J1 cards processed.
- f. MISS Number of rejects caused by reference to terms and/or codes not appearing in the glossary or in glossary update cards processed in this cycle. See E1 for possible causes for "MISS" rejects.
- g. SEQ Number of rejects caused by improper input card sequence or code assignment. See E2, E3 for possible causes for "SEQ" rejects.
- h. BAD Number of rejects caused by improper card format. See E4 for possible causes for "BAD" rejects.

NOTE: $a + b + c + d + e + f + g + h$ = total input cards.
 $a + b$ = total number of documents and profile transactions recorded.
 $c + d + e$ = total number of glossary transactions processed.
 $f + g + h$ = total number of cards rejected.

Figure 6 Interpretation of Glossary Program Listings (Cont' ..

TYPEWRITER - OPERATOR REPORT

Messages

SET CONSOLE SWS - signals beginning of cycle.

Operator sets console switches 1, 2, 3, 4, and/or 5 and toggles console switch 0 to continue

Sn OFF (where n = console switch 1, 2, 3, 4, and 5).

Shows which console switches were set in the "OFF" position. The switches in the "ON" position are not mentioned. Switch setting should correspond with the directions given to the operator.

E1 followed by 1st 40 characters of card image - transaction rejected because of reference to non-existent term and/or code in glossary or on transaction cards. This error will occur where:

K1 code refers to non-existent glossary code to be deleted,

J2 or K2 terms refers to non-existent glossary term.

If a term is referenced in the glossary, searching will continue until the first character position is exhausted, the glossary is exhausted, or the file is exhausted, whichever comes first. Subsequent cards that refer to the codes or terms gone by will also be rejected. Rejects will continue until the next highest character or glossary is called for. In short, one E1 reject may trigger a continuous run of rejects, even though the subsequent code or term references are valid.

The remedy for E1 rejects is to check card sequence and ensure that the referenced codes or terms are to valid glossary entries. J and K cards must be sorted in the order: MINOR - col. 2 numeric; Intermediate - col. 21-80 alphanumeric; MAJOR - col. 15-16 numeric.

Figure 6 Interpretation of Glossary Program Listings (Cont'd)

- E2 Followed by 1st 40 characters of the card image - transaction rejected because J1 card contained a code and term that would not preserve concurrent sequencing of code/term in the glossary. The remedy is to reassign a code to the new term or reassign codes to glossary term already recorded
- E3 Followed by 1st 40 characters of image transaction rejected because of incorrect card sequence. All J and K cards must be sorted so that cards are in ascending order by glossary number (major) and at least its first character of the term (minor). In sequencing characters, 0 thru 9 precede A thru Z.
- E4 Followed by 1st 40 characters of card image - transaction rejected because of format error. Only the following card formats are accepted.

<u>Col. 1</u>	<u>Col. 2</u>	<u>Col. 9-10</u>
J	1	Any characters or blank
K	1	
J	2	01 through 99
1	2	
2	2	
3	2	
J	3	00 through 99
1	3	
2	3	
3	3	

Figure 6 Interpretation of Glossary Program Listings (Concl'd)

3. Interpretation of Error Messages

Figure 6 also gives an interpretation of the different types of errors which are indicated on the on-line typewriter printout. The first 40 characters of each input card in error are printed out in a single line and prefaced by one of five error codes, E1 through E5. When an error is detected in an input transaction card, the information on the card is not recorded on an output magnetic tape. The error listing thus provides a record of input transactions which have been rejected for one of the five reasons explained in Figure 6. It should be noted that if a particular kind of error occurs, cards read subsequent to the error may also be rejected. The librarian must interpret the error messages to determine which transactions represent true errors and which transactions have been rejected because of a prior error condition.

B. USER INTEREST PROFILE CONSTRUCTION

The terms recorded in the system's vocabulary by means of the glossary worksheet are used to index user interest profiles. The assignment of terms to describe an interest, however, is the final rather than the first step in user profiling.

1. User Orientation and Interview

The first step in profiling is the holding of an orientation meeting for the prospective participants. Before the orientation session is held, the analysis described in Section II should be complete. Only those individuals who have been previously screened on the basis of available information should be present at the orientation meeting. Essentially, those present should expect to participate in the SDI program. The purpose of the orientation meeting is to explain what the SDI program can do for the participant and what is needed of him to obtain the defined benefits. The exact elements of this presentation cannot be defined in this manual because of individual variations that will be encountered, depending on the context surrounding the particular SDI system implementation. In all phases, however, benefits, requirements for participation, and some of the mechanics of profiling should be described verbally and amplified by printed materials which the participants can carry away from the meeting.

If feasible, each participant should be individually interviewed soon after the orientation meeting. During this interview, the interviewer should strive to obtain a detailed description of the participant's information requirements and a description of the work performed by the

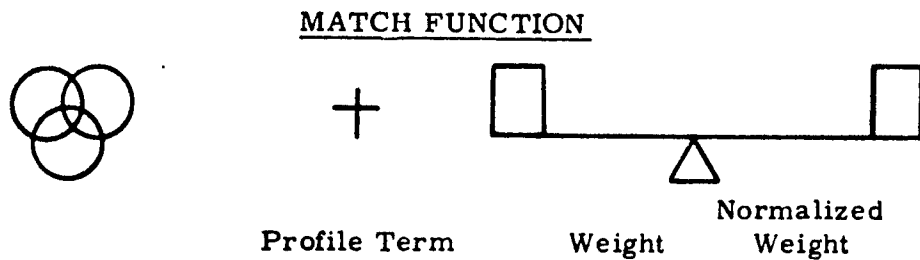
participant. This description should be in the participant's own words. A prerequisite for the interviewer is that he be able to understand what the participant wants and the nature of the projects in which he is engaged. This understanding is necessary because the interviewer must transform this user description into the standard terms of the system's vocabulary. The verbal description of the user's interests and requirements should be recorded for future use in shaping a formalized interest profile.

As the interview proceeds, the interviewer should attempt to record a statement of interest in all its particular facets. For instance, if physical materials are one facet of a particular user interest, then the interviewer should attempt to elicit a list of the materials of interest. The worksheet should bring out the various factors which make up one particular interest. As an example, suppose that a user is working on the diffusion of gases through membranes. This problem might have three factors, namely, the list of gases being diffused, the process of diffusion and factors which affect it, and the kind of membranes used.

2. Preparation of User Interest Profiles

The manner in which interest profiles are matched against document descriptions is portrayed in Figure 7, Profile Construction. Selection is based on two factors which can be utilized singly or in combination. These factors are (1) the various facets of the user interest, and (2) the weight attributed to terms describing each facet. The sample profile in Figure 7 is given for an interest described as "Effect of Fabric Geometry on the Wear Resistance of Various Fabrics." This problem has three separate facets described by three separate sets of terms selected by the profiler. Set No. 1 describes the fabric geometry aspect, Set No. 2 describes the list of materials, and Set No. 3 describes the properties being considered. Each of these facets of the problem were brought out in an interview with the participants. In addition to assigning terms to describe each facet, each term is individually assigned a numerical weight to aid in further discrimination. The operation of the sets of terms and assigned weights is brought out in Figure 8, which presents the three possible variations in profile construction.

In Figure 8, Part A, all the terms are listed in one set. Each term is assigned a weight in a manner which will cause the desired selection pattern. In the weighted strategy, selection is based only on the sum of the weights of matching terms. If the sum equals or exceeds the threshold of .999, then selection will occur. Only the weights of those profile terms which match document terms are summed. The weights of



SET NO. 1

Geometry	2	$2/15 = .133$
Weaves	4	$4/15 = .266$
Fabric Construction	7	$7/15 = .467$

SET NO. 2

Bullet Proof Fabrics	1	$1/15 = .067$
Denims	5	$5/15 = .333$
Broadcloth	7	$7/15 = .467$
Duck	4	$4/15 = .266$
Jersey	7	$7/15 = .467$
Knit Fabrics	5	$5/15 = .333$
Mesh Fabrics	5	$5/15 = .333$

SET NO. 3

Abrasion Resistance	4	$4/15 = .266$
Flexibility	6	$6/15 = .400$
Slip Resistance	2	$2/15 = .133$
Stiffness	6	$6/15 = .400$

THRESHOLD = 15

NORMALIZED THRESHOLD = $15/15 = 1.000$

Figure 7 Profile Construction

A) WEIGHTED STRATEGY

<u>Profile</u>		
<u>Term</u>	<u>Weight</u>	
A	.100	Match will occur for A ≠ B ≠ D A ≠ C ≠ E etc.
B	.300	
C	.100	
D	.800	Match will not occur for A ≠ B A ≠ B ≠ C B ≠ C etc.
E	.800	
THRESHOLD = .999		

B) BOOLEAN STRATEGY

<u>Profile</u>			
	<u>Term</u>	<u>Weight</u>	
SET NO. 1	{ A B C	.999	Match will occur for
		.999	A ≠ D
		.999	A ≠ E
			A ≠ B ≠ D etc.
SET NO. 2	{ D E	.999	Match will not occur for
		.999	A ≠ B
			A ≠ C
			D ≠ E etc.

C) COMBINED BOOLEAN AND WEIGHTED STRATEGIES

	<u>Term</u>	<u>Weight</u>	
SET NO. 1	A	.100	Match will occur for A ≠ C ≠ D A ≠ C ≠ E etc.
	B	.300	
	C	.100	
SET NO. 2	D	.800	Match will not occur for A ≠ D, C ≠ D etc.
	E	.800	

Figure 8 Selection Strategy

non-matching terms do not contribute to selection. Given the pattern shown in Part A of Figure 8, selection will occur according to the pattern shown to the right.

Part B of Figure 8, (Boolean Strategy), depicts a method of selection based on the combination of matching interest profile and document terms from different term sets in the interest profile. In this construction, all terms are assigned a maximum weight of .999. Assignment of the maximum weight essentially disables the weight basis for selection, since the matching of any single term in the interest profile would cause selection on the basis of weight. In the example in Part B, selection is limited to those documents which had been indexed by at least one term from each term set in the interest profile for the participant. As shown to the right, selection will occur if a document has been indexed by terms A and D, each contained in a different term set, but not for terms A and B, both of which appear in the same term set.

The two selection strategies can be combined as in Part C, so that selection can be based on both a combination of terms from different term sets and the weights assigned to each term. By combining the two selection modes, the number of possible selections is reduced from that obtained when either the weighted or Boolean strategies are used alone. In the example in Part A, selection would occur if terms D and E matched document terms. However, in Part C, selection would not occur for terms D and E, since both terms belong to the same term set.

Terms may also be used in a negative sense, by assigning a weight of zero. A negative term may appear in any term set, and will prevent selection no matter what other profile terms match document terms. The negative (zero weight) term is used to prevent selection of information when the presence of one or more distinctive document terms tags unwanted information. Thus, a profile can be constructed which says, "DIFFUSION OF GASES, BUT NOT NITROGEN."

When a new participant joins the SDI program, it is suggested that his profile consist merely of a single set of terms, each having a maximum weight assignment. This type of profile will yield a selection if any term in the profile matches a document term. In short, selection is based on a single term match. As the profiler gains further understanding of the user's exact interests by means of feedback from the user, the profile can be further substructured to prevent selection of information which is not desired. Operation of the single-list maximum-weight profile gives the user the maximum number of selections that he is likely to obtain from

the SDI system. If the information input is more or less homogenous from one cycle to the next, the user can estimate the volume of information that is being processed in his particular discipline. What may be brought to light is the fact that very little information is being processed of interest to a particular individual, so that profile substructuring would not be desirable.

Additional refinement of the profile can be obtained by breaking the single list of terms into two or more term sets as in Part B of Figure 8. If further refinement is necessary, non-maximum weights can be assigned to individual terms to effect a profile of the type shown in Part C.

A new subscriber interest profile is registered by means of the subscriber profile worksheet shown in Figure 9. Each new subscriber is assigned a unique six-digit number which is posted in two places marked 3 on the form. The subscriber's name and address are registered in blocks 5 and 6. Blocks 7 and 8 describe the options which the subscriber has elected pertaining to whether he will accept notification of information available for information only, information which the library will obtain on request, information which he must view in the library, information that will be circulated to him, or information supplied in the form of a personal copy. The second option refers to whether the user will accept notification in the form of title only, title with terms, or abstract title and terms.

Columns 4, 5, 6, 7, and 9 contain the actual description of the interest profile. Column 4 contains the two-digit profile number. One or more profiles may be registered on the same worksheet. Column 5 designates the number of the set to which the term is assigned. Up to nine sets of terms may be used within a single profile. Column 6 lists the assigned term weight. Columns 7 and 9 are used to register the glossary number and the term. The glossary number should correspond to one of the glossary numbers used in preparing the glossary worksheet described under Vocabulary Control. The term should be selected from one of the numbered glossaries. If it is desired to use a new term to describe an interest, this new term should also be registered in the glossary by means of an entry on the glossary worksheet.

3. Profile Updating

Profile updating is accomplished by addition or removal of punched cards from the card deck representing the current user's interest profile. Changes to an existing term card are accomplished by removal of the card, punching a new card, and insertion of the new card in place of

the old. Cards must be presented for input to the Record and Match programs in numerical sequence, first by subscriber number, then profile number and finally by term set number. Terms may be used from several different numbered glossaries if information input is similarly indexed by terms from several different glossaries. Profile header cards should not be included as input to the Record and Match programs.

C. PREPARATION OF INFORMATION FOR DISSEMINATION

Information input is processed through two channels. In one channel, the information unit is described by a set of terms selected from one or more glossaries. In a parallel channel, a graphic information unit is extracted for use as an SDI notice.

1. Information Selection

Those classes of information units identified as information input to the SDI system are first screened to determine exactly which units will be used as input. The screening process can be accomplished by a rule such as, "select all technical articles appearing in journal X," or by a subject criteria such as, "select all articles in the field of plastics." If articles are selected from a journal, the journal Table of Contents, appropriately marked, is copied as in Figure 10 to show which articles have been selected.

2. Subject Indexing

Each information unit is described by a set of glossary terms recorded on a Document Data Worksheet, Part B, shown in Figure 11. The document number is recorded in Block 3. This number is unique to the information unit and is used to control dissemination and delivery of full-size copy on request. This number will appear on the SDI notice sent to the user and will act as his reference in requesting the information units. Columns 6 and 8 contain, respectively, the glossary number and term. As in the case of profile construction, the use of a new term requires the addition of that term to the glossary by the means of an entry on the glossary worksheet.

3. Document Description

The document title and source are recorded on the Document Header Card Worksheet, Figure 12. When the information unit is a journal article, the article title page is copied concurrently with the

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	Page
REARRANGEMENTS OF PINANE DERIVATIVES By D. V. Banthorpe and D. Whittaker	373
TRANSITION-METAL COMPOUNDS CONTAINING CLUSTERS OF METAL ATOMS By F. A. Cotton	389 ✓ 00 0100
ELECTRONIC ENERGY TRANSFER By F. Wilkinson	403
DIFFUSION-CONTROLLED REACTIONS By Alastair M. North	421
METAL BORIDES By N. N. Greenwood, R. V. Parish, and P. Thornton	441 ✓ 00 0101
MOLECULAR BEAM SCATTERING By A. R. Blythe, M. A. D. Fluendy, and K. P. Lawley	465

TECHNICAL LIBRARY
U. S. ARMY
NATICK LABORATORY
NATICK, MASS.
LONDON:
THE CHEMICAL SOCIETY

Figure 10 Office Copy of Table of Contents

Influence of Oblique Channel Ends on Screw-Pump Performance

Flow of very viscous liquids through screw pumps and metering zones of extruders has been investigated by various authors, a few of whom are listed in the references (1-6). Screw-pump equations, which relate flow rate to speed, viscosity, and discharge pressure, are derived in these papers for a number of simplifying assumptions.

The helical screw channel is replaced by a straight prismatic channel with a rectangular cross section in all but one theory (5, 6). In the simplified theory, one assumes such a large aspect ratio, i.e., ratio of channel width to depth, that flow rates can be determined from all-known velocity distributions.

Continued

and the barrel. Note that the channel has oblique ends, which are ignored in the simplified theory. Isothermal flow of a very viscous Newtonian liquid is assumed.

The flow analysis is simplified when velocities are described relative to the screw. These relative velocities do not change when either the barrel is at a standstill and the screw rotates, or the screw is at standstill and the barrel rotates with an equal speed in the opposite direction, provided inertial and body forces can be ignored. Thus the theory is restricted to low Reynolds numbers, which requirement is satisfied in most screw pumps since they are exclusively used to pump very viscous liquids at low speeds.

Simplified theory (2, 3, 4) that are used in the derivation of end effects are discussed first. A schematic diagram of a screw pump is shown in Figure 1. The more important nomenclature is shown in the cross section of Figure 2. The screw-pump channel is formed between the flights, the screw root surface,

$$\frac{\partial \eta}{\partial y} = \mu \left[\frac{\partial^2 v}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} + \frac{\partial^2 w}{\partial z^2} \right]$$

$$\frac{\partial p}{\partial z} = 0 \quad (3)$$

Congruent velocity distributions in parallel cross sec-

POLYMER ENGINEERING AND SCIENCE, JANUARY, 1967

	1	2	3	4	5	6	7	8	9	10	11	12
	1	3		9	11	17	20	24	24	24	24	24
TYPE 1	1	2	00	0033	5	1	0	1	6	7	0	1
TYPE 2	1	2			0	2		5				
TYPE 3	1	2			2	1		5				

Polymer Engrg & Sci 7/1 Jan 67

Figure 12 Document Header Card Worksheet

Table of Contents and the accession number is stamped in Block 3 of the Document Header Card Worksheet and also on the Table of Contents and Document Data Worksheet, Part B. The Document Data Worksheet, Table of Contents and journal copy are returned to the subject indexer while the Document Header Card Worksheet is being completed by clerical personnel. As shown in Figure 12, the Header Card Worksheet also contains a standardized document source description. Field 5 of Card Type 1 contains the month, day, and year of publication. Field 6 contains a total number of pages. Field 7 contains a one-digit code to indicate information type, such as trade journal, scientific journal, proceeding, report, book, etc. Field 8 contains a single-digit code to indicate original indexing, abstracting, both, or neither. Field 9 contains a code to indicate whether (1) the unit is for information only, (2) the library will obtain on request, (3) the unit is for reference only in the library, (4) a copy will be circulated, or (5) a personal copy will be supplied. Field 10 indicates whether the SDI notice will contain title, title and terms, or title terms and abstract. Field 11 gives the number of EAM card-size images required to hold the SDI notice. Field 12 is not used. This information is supplied by clerical personnel who also perform the copying operations.

The Document Header Card Worksheet serves two purposes: a worksheet for keypunching, and a source of the image for the SDI notice. The Type 2 standard entry, "Title," in Block 5 of the worksheet indicates that the title should be picked up from the image above, which should be marked in brackets. Field 5, "source," for Type 3 cards indicates that the source should be picked up from below, which should also be displayed in brackets. If the information unit is extracted from an abstract journal supplied by an external document distribution system, the document number assigned by the system should also be appended to the source. For instance, if the source is the Technical Abstract Bulletin published by Defense Documentation Center, then the source should be listed as TAB, issue number, and AD number.

4. SDI Notice Image Preparation

The notice image is obtained by cutting and stripping the abstract on the Document Header Card Worksheet into an EAM card format. A cut and stripped SDI image is shown in Figure 13. The image should contain the information unit title, personal or corporate authors, extract or abstract, source, and unit number. If possible, the image should be stripped so that a one-inch margin remains at the left end. This area will later be punched with the document and subscriber numbers.

Modern Textiles 47/9 Sep 66

DURABLE PRESS

00 0933

The Role of Polyesters

by Wells Denyes
Senior Textile Engineer
Textile Development Division
Tennessee Eastman Co

WITHOUT QUESTION, the most exciting new phrase in the entire textile industry right now is "Durable Press." From the research chemist to the housewife, textile products today cannot be discussed without mentioning the new term. Researchers are already seeking new resins, new fibers,

new fabrics, and new applications for durable press. Housewives are busy restocking the family wardrobes and furnishings to take full advantage of the many wonderful properties of durable press.

Figure 13 Stripped Document Title, Source and Extract

5. Reproduction and Collation of SDI Notices

Figure 14 shows sample SDI notice cards after reproduction and punching. The notice card can be obtained by two different methods, depending upon the volume of copies required for each card. Output of the Match program is a set of cards, each card of which gives the document number and the number of selections made of that document. These cards are sorted in numerical order by the number of notice cards required, and listed.

Figure 15 shows the alternative reproduction methods. If relatively few copies of each notice image are required, then simple office copying techniques can be utilized. Pre-scored four-up sheets of EAM card stock are placed in the paper holder. All those images requiring an equal number of copies are placed, one below the other, on the copy glass (up to four in number). The required number of copies are made and the card stock is burst along the perforations. The copy cards generated by the Match program (used to generate the copy list) are matched with each decklet of duplicate notice cards. The document number punched in the copy card should match the document numbers reproduced on the notice cards. The number of copies punched in the copy card should correspond with the number of notice cards reproduced.

If a large number of notice card copies are required, then printing techniques can be used to obtain them. This reproduction alternative is depicted in the second part of Figure 15. Using this alternative, a reproduction master is made of the stripped-up notice image and the required number of copies are printed by mimeograph or offset press. The same procedure is followed in matching copy card with reproduced notice cards.

D. ANALYSIS OF USER FEEDBACK

One of the basic ingredients of an SDI system is a formalized path through which the user communicates the relevance of the information sent to him. This communication link is vital to the success of the system, since without it, the user has no formal means for indicating satisfaction or dissatisfaction with the type and volume of information received.

1. Interpretation of User Feedback

The SDI Response Form shown in Figure 16 is the means by which the user communicates routine comments to the library. The form

16 000012 04

TAB 67-3 1 Feb 67

AD-A4118 PM 4/17/67
CEN. Prices: HC \$3.00 MF \$0.65
CIVIL AEROMEDICAL INST OKLAHOMA
CITY OKLA
EVALUATION OF THE PHYSIOLOGICAL PRO-
TECTIVE EFFICIENCY OF A NEW PROTO-
TYPE DISPOSABLE PASSENGER OXYGEN
MASK.
by Ernest W. McFadden. Apr 66. 27p.
AM 66-7

Unclassified report

Descriptors: (Oxygen masks. Efficiency).
Breathing apparatus. Protective clothing. Res-
ponses. Respiration. Altitude chambers. Body
temperature. Diagnostics. Exercise. Experi-
mental design. Aviation medicine

A prototype of a new design disposable passenger mask applicable for emergency use in jet trans-
ports at altitudes to 40,000 feet was evaluated.
Six subjects instrumented to obtain a variety of
physiological information were exposed to a cham-
ber flight profile designed around the National
Aerospace Standard 1179. The two alternative
methods of determining mask performance sug-
gested in this document and based on gas analysis
and blood oxygen saturation were used simulta-
neously in this study. In order to stimulate the
respiration to the 30 liters/minute volume levels
specified in applicable regulations, the subject ex-
ercised on a bicycle ergometer through the cham-
ber flight up to and including 40,000 feet. Air-
breathing baselines were established at 10,000 and
14,000 feet with the subject resting. The 14,000-
foot baseline determination was repeated at 14,000
feet exercising at the same work load level as used
in the high-altitude tests. The mask maintained
all subjects in a satisfactory physiological condi-
tion at all altitudes up to and including 40,000 feet
for the duration of exposure used in these tests.
(Author)

Polymer Engrg & Sci 7/1 Jan 67

AD 0014 An Infrared Spectroscopic Investigation of Photodegraded Styrene Copolymer Films

Raymond B. Seymour, Hing-Shya E. Tsang, Doug Warren,* Chemistry Department, University of Houston

The degradation of organic polymers in the presence
of ultraviolet light is technically and economically im-
portant. Considerable emphasis has been placed on the
development of test procedures and the investigation of
the mechanism of photodegradation.

Committee D-20 of the American Society for Testing
Materials has established a subcommittee to evaluate the
effect of light on permanence properties of plastics. Rec-
ommended practices have been outlined for outdoor (1)
and accelerated weathering tests (2). In one test pro-
cedure, the intensity of natural sunlight is increased by
the use of mirrors (3).

Figure 14 SDI Notice Cards

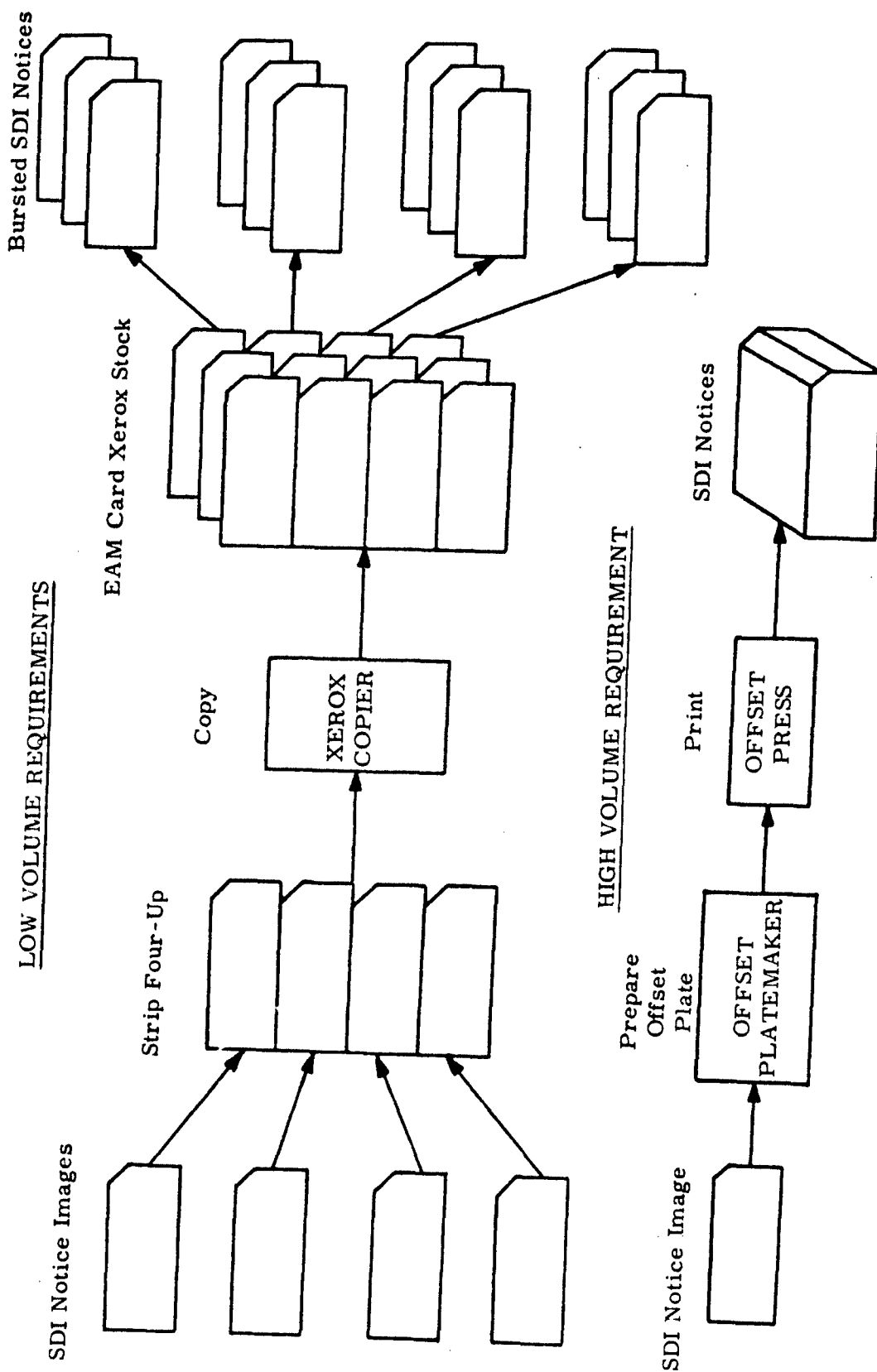


Figure 15 Reproduction Alternatives

<div style="display: flex; justify-content: space-around; border-bottom: 1px solid black; margin-bottom: 5px;"> 3020 21 1 </div> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> <div style="border-left: 1px solid black; border-right: 1px solid black; height: 40px; margin: 0 auto; width: 20px;"></div> <p>Doc. No.</p> </div> <div style="text-align: center;"> <div style="border-left: 1px solid black; border-right: 1px solid black; height: 40px; margin: 0 auto; width: 20px;"></div> <p>Subs. No.</p> </div> <div style="text-align: center;"> <div style="border-left: 1px solid black; border-right: 1px solid black; height: 40px; margin: 0 auto; width: 20px;"></div> <p>Profile No.</p> </div> </div>	<div style="text-align: right; margin-bottom: 10px;"><u>USER RESPONSE</u></div> <div style="margin-bottom: 10px;"> <input type="checkbox"/> of interest - notify when available <input checked="" type="checkbox"/> of interest - document not wanted <input type="checkbox"/> of interest - have seen copy <input type="checkbox"/> of no interest <input type="checkbox"/> refer notice to <input type="checkbox"/> modify my profile (changes below): </div> <div style="border-top: 1px solid black; height: 100px;"></div>
<p><u>INSTRUCTIONS:</u></p> <p>Please complete this card and return it to the library. Indicate your degree of interest, profile modification, change of address. You may also refer this abstract to others.</p>	

Figure 16 Response Card

is prepunched with the number of the document described by the SDI Notice and the subscriber's number and profile number. By means of the subscriber and profile numbers, the response form can be associated with the particular profile which caused selection of the information corresponding to the document number. In this particular response form, the participant can indicate any one or more of six comments. The three comments marked "of interest" can be interpreted as a positive response to the information. The fourth comment, "of no interest," indicates a negative response. The participant may also check the "refer notice to" block and indicate the name of the person to whom the notice should be referred. This places the responsibility on the library to send a copy of the notice to the person named. This block and the "modify my profile" block may be checked in combination with any of the other blocks. A response is ambiguous only if no block is checked or the "of no interest" block is checked simultaneously with one of the "of interest" blocks.

Among the response forms returned by any single user, at least fifty percent of the cards should be checked "of interest." If more than half of the notices sent to an individual are not of interest, profile personnel should contact the person to arrange for a readjustment of his interest profile. The comment, "of interest - notify when available," is an erratic response since the reading habits of individuals vary over a wide range. In most instances, the user will maintain a file of the SDI notices sent to him. This desk-top file is used for future retrieval of citations to information units which the user desires to read in full. Thus, a low percentage of checks in this block does not indicate necessarily that the profile needs improvement.

The SDI system's implementor has complete freedom in developing the format for a response form. Through experience, it may be found desirable to modify the format of the response form to accommodate local requirements. In this particular system's implementation, participants were notified when a document was available for examination at the library. Thus, a comment "of interest - notify when available" was supplied on the response form. In other systems in which documents will be sent on request, this comment might read "of interest - send document." The system's implementor also has the option of incorporating the response form on the SDI notice itself, in a single card format. This would simplify processing and reduce work loads accordingly, but would also necessitate a sacrifice of information-carrying space. The response form might be preprinted on the back of the notice card stock or preprinted on the face of the card stock in the area punched with the document, subscriber and profile numbers. For

the purpose of conducting special surveys, a different set of comments might be used. For instance, the participant might be asked to evaluate the abstract itself, rather than to indicate his interest in the information described by the abstract. This could be used as a check on the validity of abstracting or extracting techniques.

2. Document Delivery

The machinery for delivering full-size copies of information requested via the response form should be well established before reproduction work load exceed the capacity to produce. During the orientation sessions, the participant should be given a set of guidelines on what the library is prepared to supply. The document delivery factor should also be carefully weighed in selecting materials for input. In the military research library environment, document copy service can be obtained through Defense Documentation Center or the National Aeronautics and Space Administration at no direct cost. Document delivery from these agencies, however, ranges from one to two weeks and the type of information supplied is primarily government research reports. Various societies and institutions, both professional and educational, supply reprint and photocopy services which cover the journal literature. The cost of these services must be balanced against the cost of in-house copying. Availability of equipment and personnel are key factors in determining which route to take to provide full-size copy.

With the advent of microfiche, many libraries have adopted a standard procedure for ordering, storing and reproducing a wide variety of information types. In some installations, microfilm readers are located peripherally and microfiche copies can be disseminated on request. In other installations, production enlargement copying equipment is available to the library so that requested information can be enlarged to full size and disseminated as a hard copy document. Since the factors affecting document delivery vary for each installation, this manual cannot give specific guidelines on which method is best.

3. Profile Updating

The responses from each participant should be reviewed as a single unit in order to detect the desirability of profile adjustment. In evaluating responses, it is helpful to review at least the title of the information units announced to the participant. By reviewing the titles as a single unit, the profiler can detect the causes for selection of irrelevant information. The blind addition of terms used to index notices marked

relevant by the participant is not a useful means for amplifying the profile. Success in profile amplification depends rather on detecting the pattern exhibited by the relevant information units. Profiles should be updated by adding terms which reinforce this pattern and by deleting terms which do not follow it. If the number of responses is insufficient to develop a selection pattern, the participant himself should be personally contacted to reassess his entire profile.

In long-term operations each participant should be contacted periodically, even though responses may be favorable. This practice will ensure that the participant is obtaining the maximum benefit that the system can provide. Even though a participant is satisfied with his present information flow rate and relevancy, improvements might be obtainable through further profile refinement.

E. COST CONTROL

It is difficult, if not impossible, to assess the real value attached to a new information service. Since some of the most important benefits are derived only after extensive operation, it is unwise to evaluate an information system purely on the basis of immediate results. Some judgment must be used in deciding within each organization which information services are deemed most valuable by the users. In recent years, SDI has assumed a place of importance comparable to mechanized retrospective information retrieval. The cost of SDI is certainly comparable, if not greater than the cost of information retrieval because of the larger number of profiles, which are equivalent to bibliography requests, that are periodically processed. Yet, it is generally recognized that the SDI system leads to improved utilization of the information collection. Even though a price cannot be placed on the benefits derived, however, systems personnel should be conscious of the major costs centers created by operation of the SDI system.

1. Cost Control Centers

SDI system operation costs can be isolated in three costs centers: those associated with document processing, those associated with profiling, and those incurred in matching profiles against document descriptions and subsequent distribution of SDI notices. Costs may be expressed in terms of manpower requirements, equipment utilization, and raw materials consumption.

In assigning costs in terms of manpower, materials and equipment, it is necessary to diagram the exact system's configuration implemented. This diagram will differ for each installation, since different approaches must be adopted to meet local requirements. This flow diagram should point out all processing operations involved in the flow of materials from one process to the next. During systems implementation, and periodically through the life of the system, the productivity of each process should be measured and evaluated.

Some general observations can be made that can be used as guidelines in implementing a version of this SDI system. Most likely, the value of raw materials consumed will be negligible in proportion to expenditure of manpower and utilization of equipment. The cost of an EAM card is miniscule compared with the cost incurred in putting the information on the card. In the realm of document input processing, the number of man-hours expended in selecting and subject indexing documents is approximately three times greater than any other single manpower expenditure affecting information input. Preparation of the SDI notice image represents approximately twenty percent of man-hours associated with document processing. Document selection and indexing represents over fifty percent of document processing hours. These observations highlight the desirability of obtaining abstracts which are already rigorously formatted and of processing pre-indexed materials. Thus, abstracts in STAR and TAB are prime candidates for input on the basis of cost alone.

It is difficult to give guidelines on the expenditure of man-hours in developing successful interest profile. Time consumed may range from 5 minutes to a full work-day for one profile. These extremes can be attributed in part to the degree of understanding of the profiler and the complexity of the subject matter. Applicability of the subject indexing tool is also a very important factor. Much time can be consumed in attempting to describe a subject which is inadequately represented by terms in the vocabulary. This points out the need for extensive analysis of the vocabulary prior to implementation of the SDI system.

Machine utilization time is the most predictable cost factor, since operating time is usually directly proportional to the number of units processed by the machine. Even before an operation is implemented, machine running time can be estimated rather accurately by multiplying the estimated number of units to be processed by the machine's processing rate. In this system, the computer time required to select one notice is the largest single cost attributable to the document/profile matching process. This indicates the desirability of utilizing direct disk files or inverted tape files, rather than direct tape files.

2. Average Operating Costs

In calculating average operating costs, the cost of document input can be prorated among all other information services offered. If the SDI system can utilize machine-readable records produced as input to other in-house automated information services, the cost of worksheet preparation and keypunching can also be prorated. The cost of notice image preparation, however, is usually characteristic of the SDI system so that proration is not feasible. The cost of profiling and information selection also cannot be prorated, since these are characteristic only of the SDI system. Proration of costs does not reduce the total cost of all information services offered, but rather raises the cost of other services with a corresponding reduction in the cost of the SDI system. Proration points out the fact that some costs are attributable to more than one information service, i. e., the cost of the benefits derived are shared.

In developing average costs, the answers to three questions should be sought - how much does it cost to add one more subscriber? process one more document? or deliver one more SDI notice? This approach is more informative than merely estimating the cost of all profiles and dividing by the total number of profiles. The cost of adding an additional profile should be somewhat less than the average cost of existing profiles because of the improvements to the vocabulary, increased understanding of profiling personnel, and refinement in procedures. Incremental costs can be obtained by plotting costs in the various cost centers over a period of time.

3. Measures of Systems Efficiency

There are various standard methods for indicating the efficiency of an SDI system. The easiest to compute is called the relevance ratio. This is a ratio of the number of responses marked relevant to the total number of notices sent. This method of calculation is more informative than the method which uses the total number of responses as the denominator. A companion to this indicator is the recall ratio, which is the percentage of relevance selections actually retrieved. This is difficult to calculate because the number of possible relevant selections can only be assessed manually. Sample checks can be run by requesting a participant to scan a random sample of titles from which selections were made for him by computer. For example, if through manual selection, the participant estimates that five percent of the sample titles are relevant and the sample is an adequate representation of the total input, then it can be assumed that five percent of the total sample would be relevant. If only 2 percent of the

total input population was retrieved mechanically, then the recall ratio is 2 to 5 or forty percent.

The dissemination ratio is the ratio of the average number of notices sent to the total number of documents scanned. For instance, if 1,000 documents are scanned and an average of 100 notices are sent to each participant, then the dissemination ratio is ten percent. This measure indicates the screening capacity of the system. That is, ninety percent of the documents are eliminated from consideration of the user because of the operation of the system.

The distribution of the number of notices sent to all participants is, in itself, a measure of the system's efficiency. If five users receive one notice each, and one user receives five notices, the average number of notices per user is 1.67. However, the fact that a single user receives five times as many notices as any other user is a significant observation. A distribution curve portrays more about the system's operation than does a numerical average.

In planning the reproduction of SDI notices, the number of times each document is selected is a significant factor. The curve representing a plot of the number of documents selected zero times, one time, twice, three times, etc. is quite revealing of the degree to which the document collection matches the interests of the subscribers. An analysis of document selections can also be used to show the effect of each document increment on the notice distribution pattern. In most instances, one finds by such an analysis, that approximately one fourth of the documents are responsible for one fourth of the selections, although the average may be two selections per document input. The document selection curve is skewed towards the lower end, with the larger number of documents being selected two, three, or four times.

In performing various statistical measurements on the efficiency of the system, unreliable figures should be discounted. For instance, if a person receives two notices, one of which he marks relevant and the other irrelevant, a fifty percent relevance ratio is an unreliable indicator. Purely by chance, one out of two notices might be relevant. Less chance is involved, however, when ten notices are marked relevant out of twenty. Average figures should not include unrepresentative figures. For instance, if nine out of ten participants obtain over fifty percent relevancy and one receives zero relevancy, the latter figure should not be included in an average of the former, because this would not lead to an indicative average relevancy for the system.

IV. DATA PROCESSING FUNCTIONS

The following section of the manual pertains to the mechanical operations involved in processing punched cards and magnetic tape files. For the most part, these operations are best described diagrammatically. Although some of the figures in this section duplicate some of the former figures, they are reproduced here in order to permit the extraction of whole sections of the manual for distribution to specialized personnel who will be performing the procedures described. This section is divided into a description of those procedures pertaining to punched card operations and those procedures performed by programmed digital computer.

A. DATA PREPARATION (KEYPUNCHING AND CARD PROCESSING)

The computer programs described in Subsection B have three kinds of card input; glossary terms, document descriptions, and subscriber profiles. Output of the computer programs is also a punched card deck used to prepare SDI notices. One of the punched cards sent to the subscriber is returned by him and also requires punching and processing. The punching of computer input cards is described in paragraphs 1 through 4. Paragraphs 5 through 8 describe EAM procedures for processing punched cards to prepare them for input to the computer programs or to prepare them for dissemination to the participants in the SDI program.

1. Data Transcription Conventions

Figure 17 entitled, GE 225 Special Character Representation, shows the correspondence between the character set available on a standard IBM 026 keypunch and the manner in which that character is printed on the GE 225 on-line high-speed printer. Notice that the correspondence is 1 for 1 for alphanumeric and most of the special characters. The IBM apostrophe translates to the GE underscore. The IBM ampersand translates to the plus sign, the IBM underscore translates to the GE left bracket and the IBM greater-than sign translates to the GE right bracket. There is no equivalent print symbol for the IBM less-than sign. In systems operating with compatible keypunch and high-speed printer, such a translation table is unnecessary. In this system, however, the use of keypunched underscore and greater-than signs was necessary to obtain a printed left and right bracket. Observance of this convention was also necessary in completing the data worksheets, when a parenthesis was called for.

In interpreting the GECOM programs, it is necessary to note that the GECOM hyphen is represented by the IBM apostrophe. This is, in turn, printed as an underscore on the high-speed printer. GECOM left and right parentheses map into high-speed printer left and right brackets. The GECOM quote is represented by the IBM number sign, and the GECOM plus is represented by the IBM ampersand which maps into the high-speed printer plus.

GE Print Symbol	Hollerith Code	Octal Code	IBM Print Symbol	GECOM Symbol
#	3-8	13	#	"
@	4-8	14	@	none
—	5-8	15	'	- (hyphen)
=	6-8	16	=	=
+	12	20	&	+
.	12-3-8	33	.	.
none	12-4-8	34	<	
-	11	40	-	- (minus)
\$	11-3-8	53	\$	none
*	11-4-8	54	*	*
space	none	60	space	space
/	0-1	61	/	/
,	0-3-8	73	,	,
%	0-4-8	74	%	none
[0-5-8	75	_	(
]	0-6-8	76	>)

Figure 17 GE-225 Special Character Representation

In the following directions on keypunching, three kinds of figures are given for each type of card. The first figure is the data worksheet from which cards are punched. The next figure gives a field-by-field description of the card to be punched and corresponding card format for a keypunch program card and lead card. Information from the lead card is gangpunched into all cards. The third figure in each group shows actual samples of the cards punched.

2. Glossary Terms

Directions for punching glossary terms are given in Figures 18 (Glossary Worksheet), 19 (Glossary Card Formats), and 20 (Glossary Card Samples). Each line on the glossary worksheet represents one card image containing seven fields. Field 3 (card columns 3 through 10) is not used. The term in Field 7 should always be left justified.

The program and lead cards given in Figure 19 are for regular use. Other program cards and lead cards should be developed for bulk glossary buildup. For instance, in the initial stages of glossary construction, large numbers of terms may be assigned the same glossary number. This number could be duplicated through program card control. The code field in Field 6 might be prepunched into a serialized deck by computer, so that necessity for manual punching of this field might be circumvented in bulk glossary input.

3. Document Descriptions

Punching of document descriptions is displayed in Figures 21 through 27. Documents are described by two kinds of cards: Header Card containing special codes, document title, and document source are described in Figures 21 through 24; Document term cards are described in Figures 25 through 27.

Three card subtypes are identified on the Document Header Card Worksheet in Figure 21. The first card contains twelve fields, the last of which is unused. The second card type contains five fields as does the third card type. The title in card Type 2, Field 5, should be picked up from the top of the worksheet and is represented by the bracketed information that heads each document. In the Type 3 card, the source in Field 5 is picked up at the bottom of the worksheet. If the source is an abstract journal containing numbered abstracts, the number of the abstract is also keypunched at the end of the source title, volume number, and date. Up to three cards may be used to keypunch the title. Information in Fields

Field	Name	Card Columns	Data	Program Card	Lead Card
1	Transaction code	1	J, K	/	J
2	File number	2	1	0	1
3	Not used	3-10	blank	-&&&&&&&	blank
4	Term frequency-of-use	11-14	blank, num	&&&&	blank
5	Glossary number	15-16	num	b&	blank
6	Term code	17-20	num	b&&&	blank
7	Term	21-80	a/n	1AA...	blank

Legend for DATA column: num equals numeric; a/n equals alphanumeric

Legend for PROGRAM CARD column: b equals blank; ... indicates fill field with preceding character

NOTES:

FIELD NOTE

- 1 When field 1 contains K, copy field 7, even though it contains a miss-pelled term
- 4 Field 4 may contain blanks or a 4-digit number, including 0000.
- 7 The first character in field 7 should never be a special character, a punctuation mark, or a space.

REMARKS:

Always supply leading zeros in a numeric field.

Program and lead card formats are given above for punching cards from worksheets containing a J in field 1 and blanks in field 4. Devise different program and lead cards for other conditions, as necessary.

Figure 19 Glossary Card Formats

[illegible]

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Influence of Oblique Channel Ends on Screw-Pump Performance

Flow of very viscous liquids through screw pumps and metering zones of extruders has been investigated by various authors, a few of whom are listed in the references (1-6). Screw-pump equations which relate flow rate to speed, viscosity, and discharge pressure, are derived in these papers for a number of simplifying assumptions.

The helical screw channel is replaced by a straight prismatic channel with a rectangular cross section in all but one theory (5, 6). In the simplified theory, one assumes such a large aspect ratio, i.e., ratio of channel width to depth, that flow rates can be calculated from all-known velocity distributions.

and the barrel. Note that the channel has oblique ends, which are ignored in the simplified theory. Isothermal flow of a very viscous Newtonian liquid is assumed.

The flow analysis is simplified when velocities are described relative to the screw. These relative velocities do not change when either the barrel is at a standstill and the screw rotates, or the screw is at standstill and the barrel rotates with an equal speed in the opposite direction, provided inertial and body forces can be ignored. Thus the theory is restricted to low Reynolds numbers, which requirement is satisfied in most screw pumps since they are exclusively used to pump very viscous liquids at low speeds.

The simplified theory (2, 3, 4) that are used in the derivation of end effects are discussed first. A schematic diagram of a screw pump is shown in Figure 1. The more important nomenclature is shown in the cross section of Figure 2. The screw-pump channel is formed between the flights, the screw root surface,

$$\frac{\partial \eta}{\partial y} = \mu \left[\frac{\partial^2 v}{\partial x^2} + \frac{\partial^2 v}{\partial y^2} + \frac{\partial^2 v}{\partial z^2} \right]$$

$$\frac{\partial p}{\partial z} = 0 \quad (3)$$

Congruent velocity distributions in parallel cross sections

POLYMER ENGINEERING AND SCIENCE, JANUARY, 1967

	1	2	3	4	5	6	7	8	9	10	11	12
	1	3		9	11		17	20		24		30
TYPE 1	1	2	00 00.33	0	1	0 10 1 6 7	0 1 2 2 1 1 3	2				
TYPE 2	1	2		0	2		5					
TYPE 3	1	2		2	1		5					

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Figure 21 Document Header Card Worksheet

Field	Name	Card Columns	Data	Program Card	Lead Card
1	Transaction code	1	1	0	1
2	File number	2	2	&	2
3	Document accession number	3-8	num	b&&&&&	blank
4	Card type	9-10	01	b&	blank
5	Publication date	11-16	num	1AAAAA	blank
6	Page total	17-19	num	AAA	blank
7	Document type	20	1, 2, 3, 4, 5	A	blank
8	Processing code	21	1, 2, 3, 4	A	blank
9	Document availability	22	1, 2, 3, 4, 5	A	blank
10	Notice format	23	1, 2, 3	A	blank
11	Number of notice cards	24	num	A	blank
12	Not used	25-80	blank	A...	blank

Legend for DATA column: num equals numeric.

Legend for PROGRAM CARD column: b equals blank; ... indicates fill field with preceding character.

NOTES:

FIELD NOTE

5 The publication date should appear as month-day-year. December 1, 1967 would appear as 120167.

11 Field 11 should never contain a zero.

REMARKS:

Always supply leading zeros in a numeric field.
Program and lead card formats are given for all three types of document header cards.

Figure 22 Document Header Card Format (Type I)

Field	Name	Card Columns	Data	Program Card*	Lead Card*
1	Transaction code	1	1		
2	File number	2	2		
3	Document accession number	3-8	num		
4	Card type	9-10	02, 21		
5	Title or source	11-80	a/n		

*See Figure IV-6

Legend for DATA column: num equals numeric; a/n equals alphanumeric.

NOTES:

<u>FIELD</u>	<u>NOTE</u>
3	Duplicate the number from Type-1 Header Card.
4	If the title is longer than 70 characters, use Card Types 03 and 04 for continuation cards. The title is bracketed and usually appears at the top of the form. Use * for non-keyboard characters. The Type-3 header card should use 21 as card type. The source appears at the bottom of the form. If the extract is taken from TAB or STAR, add the AD or N number to the source.

Figure 23 Document Header Card Formats (Types II & III)

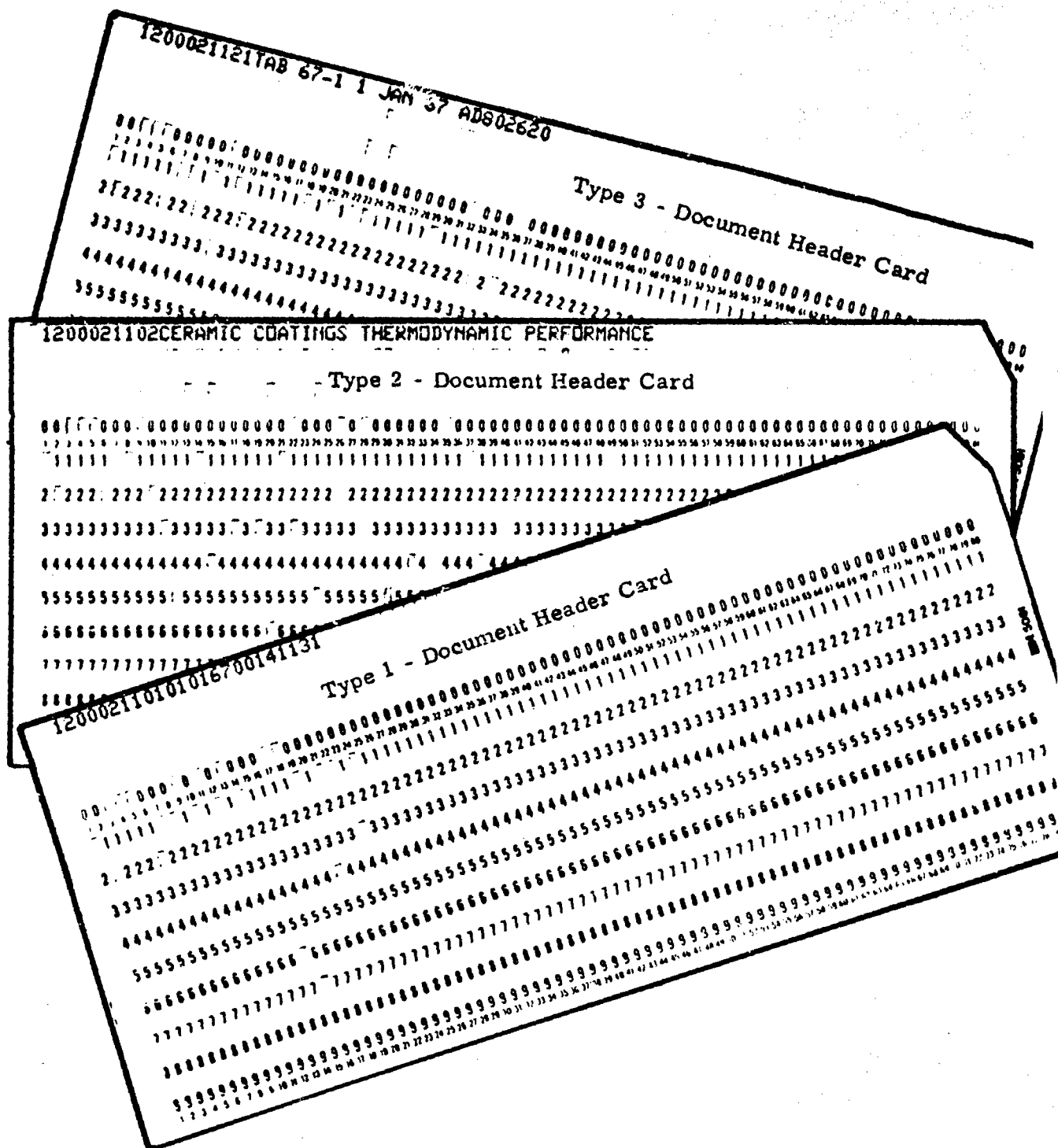


Figure 24 Document Header Card Samples

Field	Name	Card Column	Data	Program Card	Lead Card
1	Transaction code	1	J	/	J
2	File number	2	2	0	2
3	Document accession number	3-8	num	b&&&&&	blank
4	Card type	9-10	90	0&	90
5	Not used	11-14	blank	-&&&	blank
6	Glossary number	15-16	num	b&	blank
7	Not used	17-20	blank	-&&&	blank
8	Term	21-80	a/n	1AA...	blank

Legend for DATA column: num equals numeric; a/n equals alphanumeric.

Legend for PROGRAM CARD column: b equals blank; ... indicates fill field with preceding character.

NOTES:

FIELD NOTE

- 8 The first character in field 8 should never be a special character, a punctuation mark, or a space.

REMARKS:

Always supply leading zeros in a numeric field.

Figure 26 Document Detail Card Format

1 through 3 is duplicated into all three Type 2 title cards. The first title card is numbered 02 in Field 4, the second title card is numbered 03, and the third 04. All segments of the title should be left justified. Title words should not be broken between cards. If a symbol or punctuation mark in the title cannot be reproduced on the keypunch, use an asterisk in the space where this character belongs. The same rule for transliteration holds for the source field in Type 3 cards. The number printed in Field 3 on all three types of cards should be gangpunched into all the cards for that document. Figure 22 gives the format for Header Type 1 cards and Figure 23 gives the format for Types 2 and 3 Header cards.

Document terms are punched from the Document Data Worksheet, Part B in Figure 25. Each line on the form represents a single card image. The document number in Field 3 is duplicated into all cards in the set.

4. Subscriber Profiles

Figures 28 through 31 display the worksheet and card formats for punching subscriber profiles. Two kinds of cards describe the profile. The header card format is described in Figure 29 and the detail card format in Figure 30. Figure 31 gives samples of both types of cards.

As shown in Figure 28, the header card contained 8 fields, all of which are used. The number in Field 3 is reproduced into both header and detail cards. Header cards should be punched separate from detail cards so that a program card can be used.

Field 8 (columns 17 through 20) is not used in the detail cards. Ignore punctuation marks in Field 6 of the detail card. Left justify term in Field 9. If a number is missing on a line, in Fields 4, 5, 6, or 7, duplicate the number from previous card. These fields should all be filled for each term punched.

5. SDI Notice Processing

The ultimate objective of this process is to obtain pairs of cards which are identically punched. One card in the pair will contain an abstract of the document. The other card in the pair will be a preprinted form. The card pairs will be numerically sequenced by the number appearing in the second field in both cards (columns 8 through 13).

Field	Name	Card Column	Data	Program Card	Lead Card
1	Transaction code	1	1	0	1
2	File number	2	3	&	3
3	Subscriber number	3-8	num	b&&&&&	blank
4	Card type	9-10	00	0&	00
5	Subscriber name	11-30	a/n	1AA...	blank
6	Subscriber address	31-78	a/n	1AA...	blank
7	Availability required	79	1, 2, 3, 4, 5	b	blank
8	Notice format required	80	1, 2, 3	b	blank

Legend for DATA column: num equals numeric; a/n equals alphanumeric.

Legend for PROGRAM CARD column: b equals blank; ... indicates fill field with preceding character.

NOTES:

FIELD NOTE

- 5 Subscriber name should be punched as it is to appear on listing.
- 6 Subscriber address should be punched as it is to appear on listing.

REMARKS:

Always supply leading zeros in a numeric field.

Figure 29 Profile Header Card Format

Field	Name	Card Column	Data	Program Card	Lead Card
1	Transaction code	1	J	/	J
2	File number	2	3	0	3
3	Subscriber number	3-8	num	b&&&&&	blank
4	Profile number	9-10	num	b&	blank
5	Term set (L)	11	num	b	blank
6	Term weight	12-14	num	b&&	blank
7	Glossary number	15-16	num	b&	blank
8	Not used	17-20	blank	-&&&	blank
9	Term	21-80	a/n	1AA...	blank

Legend for DATA column: num equals numeric; a/n equals alphanumeric.

Legend for PROGRAM CARD column: b equals blank; ... indicates fill field with preceding character.

NOTES:

FIELD NOTE

- 4 Profile numbers start at 01.
- 5 Term set numbers start at 1.
- 6 Term weight can be 000.
- 9 The first character in field 9 should never be a special character, a punctuation mark, or a space.

REMARKS:

Always supply leading zeros in a numeric field.

Figure 30 Profile Detail Card Format

Output from the computer consists of two kinds of cards: a Copy Card shown in Figure 32 and a Distribution Card shown in Figure 35. These two kinds of cards are intermixed in the computer output card deck, as shown in Figure 45. All the cards in the deck should be in sequence by the number in the first field. First, the two kinds of cards must be separated. Since it is desirable to maintain the original numerical sequencing, a column should be chosen which is blank in the copy card and punched with a number which is the same in all distribution cards. In the examples given, a numeric sort on column 11 will result in copy cards falling in the reject pocket and distribution cards falling in the zero pocket. The copy cards should be further sorted by columns 8 through 10 and the sorted cards listed 80-80. The cards and the list should be delivered to the library; the distribution cards should be retained for further processing.

The library should return the copy cards collated with notice cards (see Figure 33). The notice cards will contain no punches. The number contained in Field 1 (columns 1 through 6) of each copy card should be reproduced into all the notice cards behind it. In other words, the copy card is a master card and the notice cards are blank detail cards. This operation is shown in Figure 34 (Notice Card Sort). After intersperse gang-punching, sort out the copy cards and sort the notice cards on Field 1.

The distribution cards are merely duplicated into the blank response card forms. A response card is shown already punched in Figure 37. If the distribution cards are not in numerical order on Field 1, they should be sorted on this field prior to duplication. The sorting and duplication operations are shown in Figure 36 (Distribution Card Sort and Collation with Notice Cards). After duplication, the punched response forms are merged, card for card, with the notice cards. The resulting deck should contain a response card paired with each notice card, with the response card on top. The merged deck is then sorted numerically on the second field (columns 8 through 13). The card deck thus merged and sorted should be interpreted and delivered to the library. The copy and distribution cards should also be delivered to the library.

6. Response Card Processing

The response card, Figure 37, is returned by the library with one or more checks in the boxes in the upper right quadrant. These boxes are assumed to be numbered from 1 through 6 from top to bottom. The check marks should be punched in column 80. If more than one box is checked, punch the topmost check mark. The cards should then be sorted in column 80 and each individual group of cards counted. The cards

[illegible]

68

16 00012 04

TAB 67-3 1 Feb 67

AD-44118 FM 6/17/67
 CES, 1 Paces, HC 5100 MD 5065
 CIVIL AEROMEDICAL INST OKLAHOMA
 CI 10814
 EVALUATION OF THE PHYSIOLOGICAL PRO-
 TECTIVE EFFICIENCY OF A NEW PROTO-
 TYPE DISPOSABLE PASSENGER OXYGEN
 MASK.
 by Ernest H. McElderen Apr 56, 27p
 AM 66 7

Unclassified report

Descriptors: Oxygen masks; Efficiency;
 Breathing apparatus; Protective clothing; Res-
 ponses; Respiration; Altitude chambers; Body
 temperature; Diagnostics; Exercise; Paper
 mental design; Aviation medicine

A prototype of a new design disposable passenger mask applicable for emergency use in jet trans-
 ports at altitudes to 40,000 feet was evaluated.
 Six subjects instrumented to obtain a variety of
 physiological information were exposed to a cham-
 ber flight profile designed around the National
 Aerospace Standard 1179. The two alternative
 methods of determining mask performance sug-
 gested in this document and based on gas analysis
 and blood oxygen saturation were used simulta-
 neously in this study. In order to stimulate the
 respiration to the 40 liters/minute volume levels
 specified in applicable regulations, the subject ex-
 exercised on a bicycle ergometer through the cham-
 ber flight up to and including 40,000 feet. Air
 breathing harnesses were established at 10,000 and
 14,000 feet with the subject resting. The 14,000
 foot harness determination was repeated at 14,000
 feet exercising at the same work load level as used
 in the high altitude tests. The mask maintained
 all subjects in a satisfactory physiological condi-
 tion at all altitudes up to and including 40,000 feet
 for the duration of exposure used in these tests.
 (Author)

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An Infrared Spectroscopic Investigation of Photodegraded Styrene Copolymer Films

Raymond B. Seymour, Hing-Shya E. Tsang, Doug Warren,* Chemistry Department, University of Houston

The degradation of organic polymers in the presence
 of ultraviolet light is technically and economically im-
 portant. Considerable emphasis has been placed on the
 development of test procedures and the investigation of
 the mechanism of photodegradation.

Committee D-20 of the American Society for Testing
 Materials has established a subcommittee to evaluate the
 effect of light on permanence properties of plastics. Rec-
 ommended practices have been outlined for outdoor (1)
 and accelerated weathering tests (2). In one test pro-
 cedure, the intensity of natural sunlight is increased by
 the use of mirrors (3).

Figure 33 SDI Notice Cards

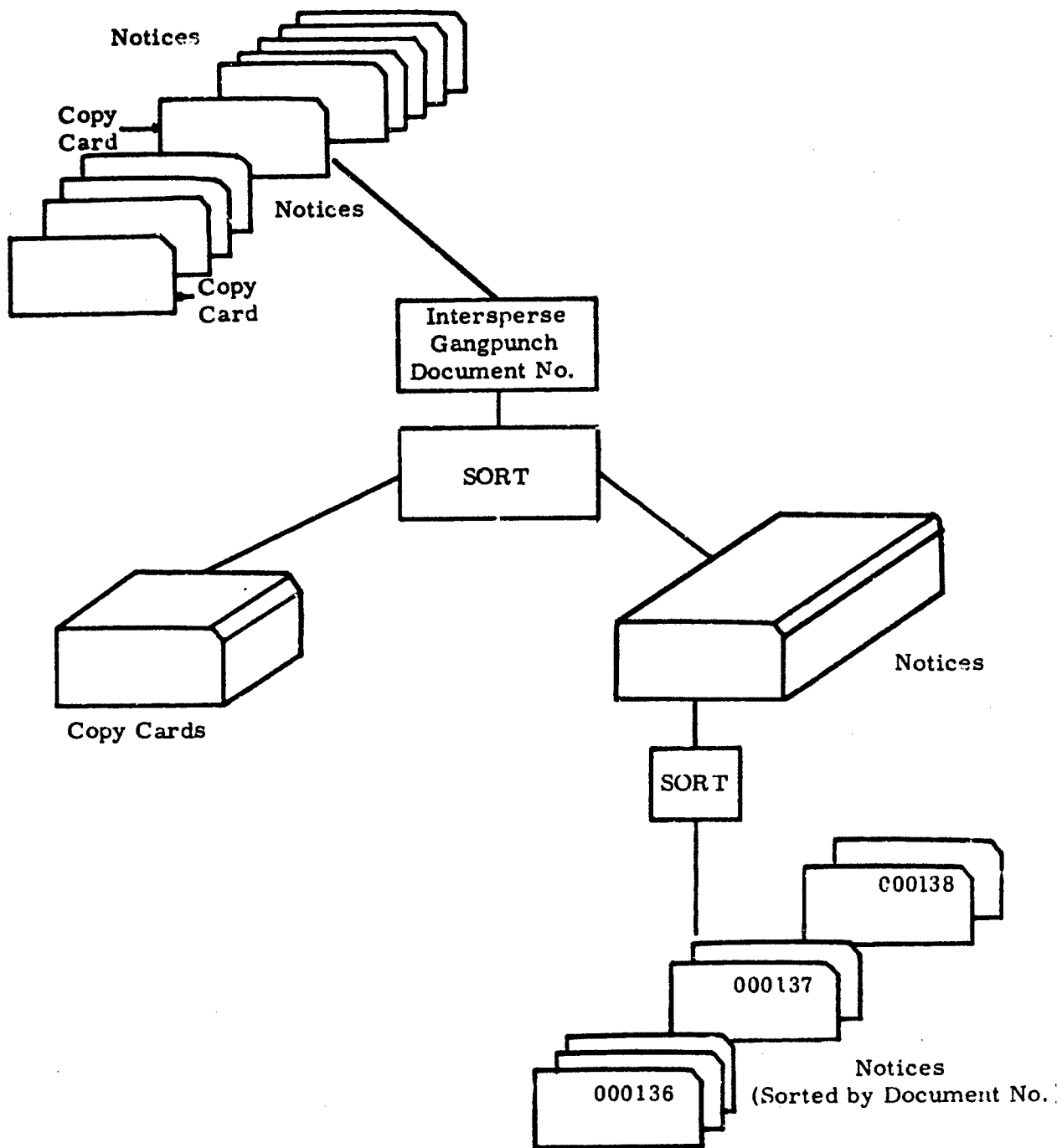


Figure 34 Notice Card Sort

[illegible]

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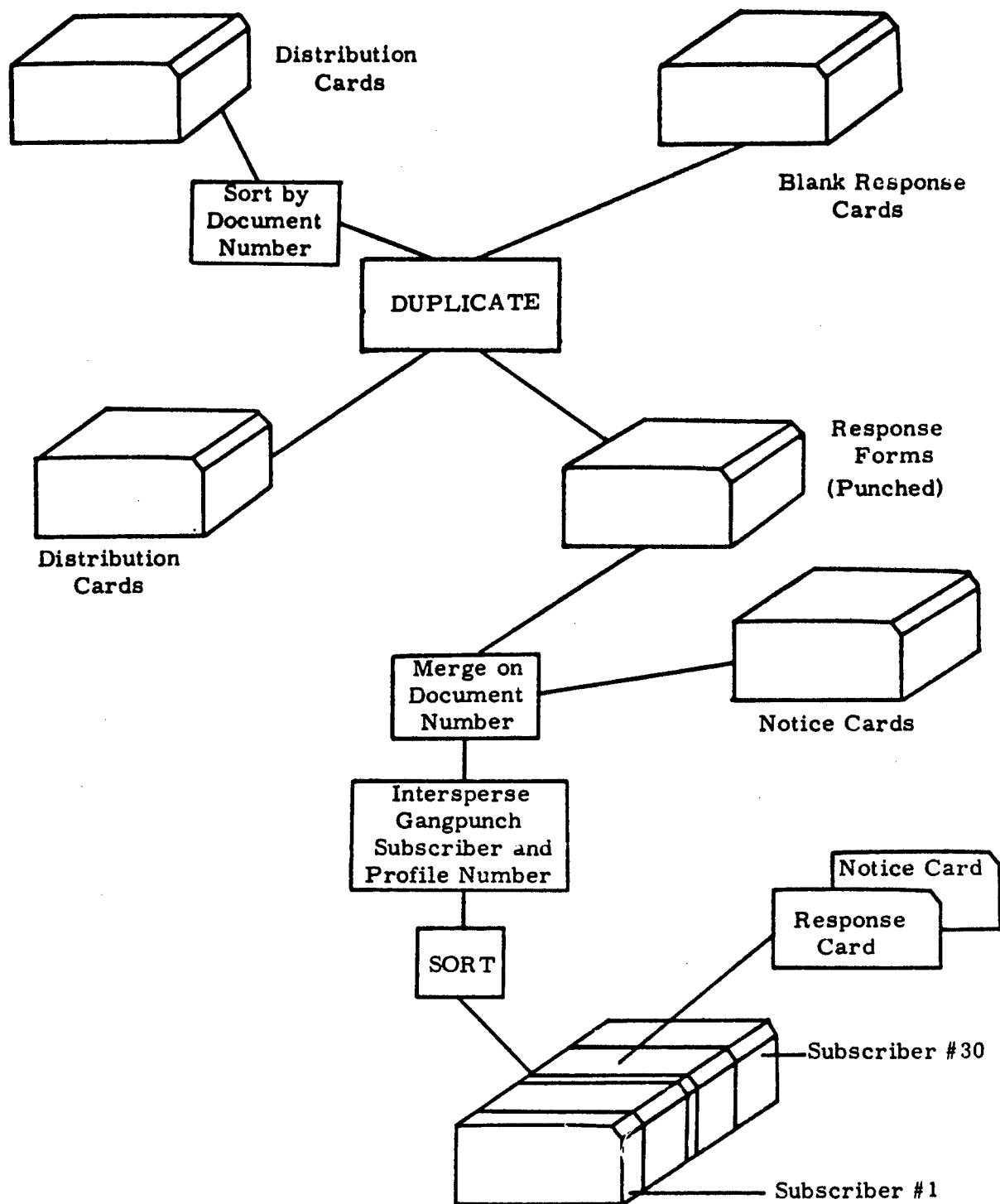


Figure 36 Distribution Card Sort & Collation With Notice Cards

3020	21	1	<p>USER RESPONSE</p> <p><input type="checkbox"/> of interest - notify when available</p> <p><input checked="" type="checkbox"/> of interest - document not wanted</p> <p><input type="checkbox"/> of interest - have seen copy</p> <p><input type="checkbox"/> of no interest</p> <p><input type="checkbox"/> refer notice to</p> <p><input type="checkbox"/> modify my profile (changes below</p>
Doc. No.	Subs. No.	Profile No.	
<p>INSTRUCTIONS:</p> <p>Please complete this card and return it to the library. Indicate your degree of interest, profile modification, change of address. You may also refer this abstract to others.</p>			<hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>

Figure 37 Response Card

should then be sorted in Fields 3 and 2 and listed 80-80. Both the cards and the list and the count of card Types 1 through 6 should be sent to the library.

7. Card Processing for Glossary Input

Document, profile and glossary cards are all input to the glossary program. The general flow for processing these cards is given in Figure 38 (Data Input Preparation in General Flow). Key punching has already been discussed in Paragraphs 2, 3, and 4 above. After proofing and correcting, all the cards are sorted as in Figure 39, which is designated as Sort 3 in Figure 38. The resulting three-card decks are stacked with sorted transactions first, document header cards second, and profile header cards third.

8. Card Processing for Record and Match Program Input

Figure 40 shows the sorting operations necessary to prepare input to the Record and Match programs. The Record and Match programs require only document detail and profile detail cards. Glossary cards, document header, and profile header cards are not input to these programs. Document and profile cards can be separated by sorting on column 2. Those cards containing a 2 in column 2 are further sorted in columns 3 through 8. Cards containing a 3 in column 2 are further sorted in columns 3 through 10. Type 2 cards are stacked in front of Type 3 cards.

B. DATA PROCESSING BY COMPUTER

This section pertains to the operation of computer programs developed for this system and also to the integration of these programs into a larger information processing system capable of supporting additional automated information services. In designing the SDI system, considerable forethought was given to making the computer programs compatible with the overall objectives of providing a wide variety of automated information services. This goal was met by providing SDI systems outputs which could be plugged into a larger network of computerized operations, such as might be used to produce accessions lists, catalog cards, information retrieval files, and document inventory lists (see Figure 41).

1. General Information Flow in an Integrated Information System

The SDI information system is designed to accept all subscriber profiles, document descriptions and vocabulary control cards in

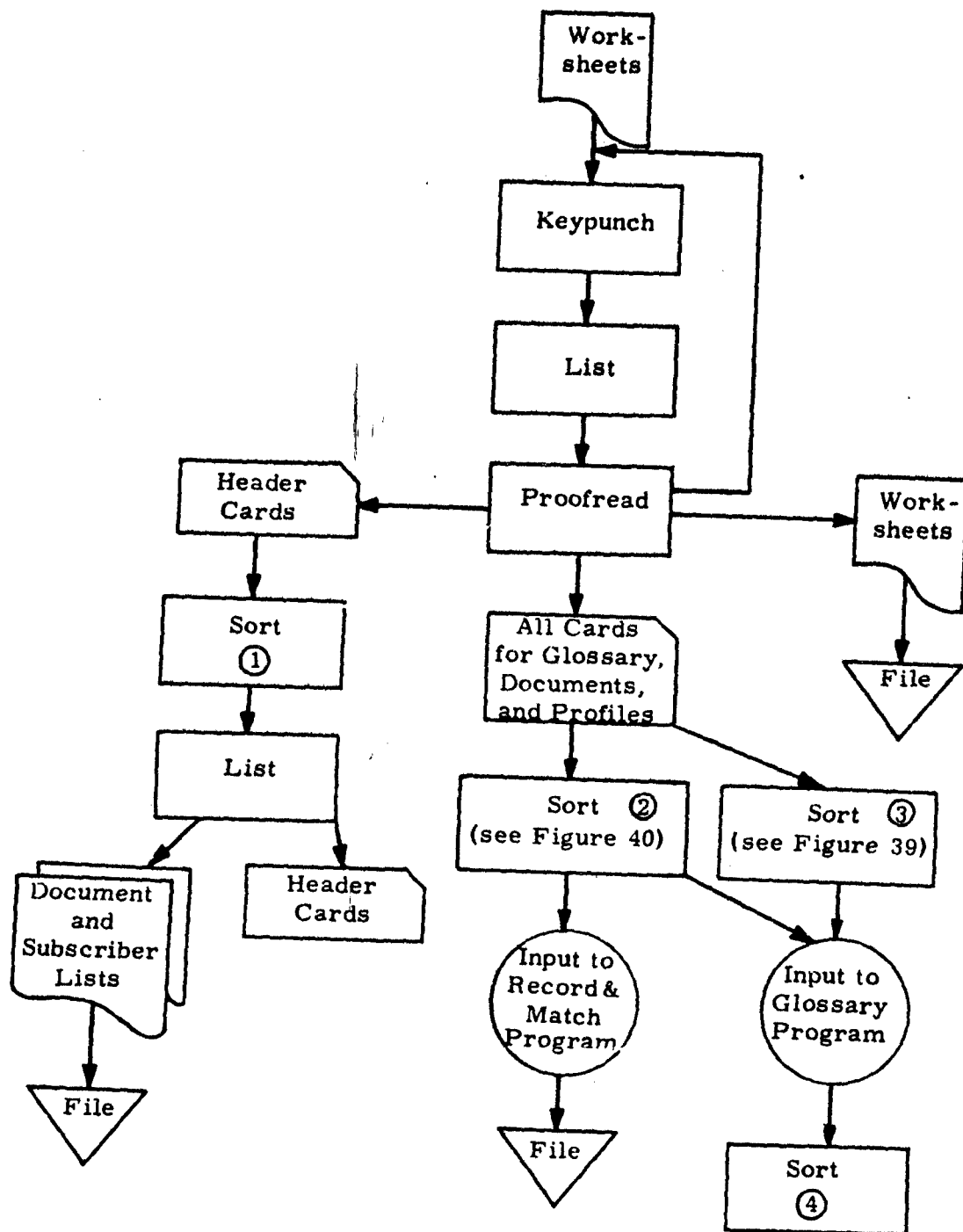


Figure 38 Data Input Preparation - General Flow

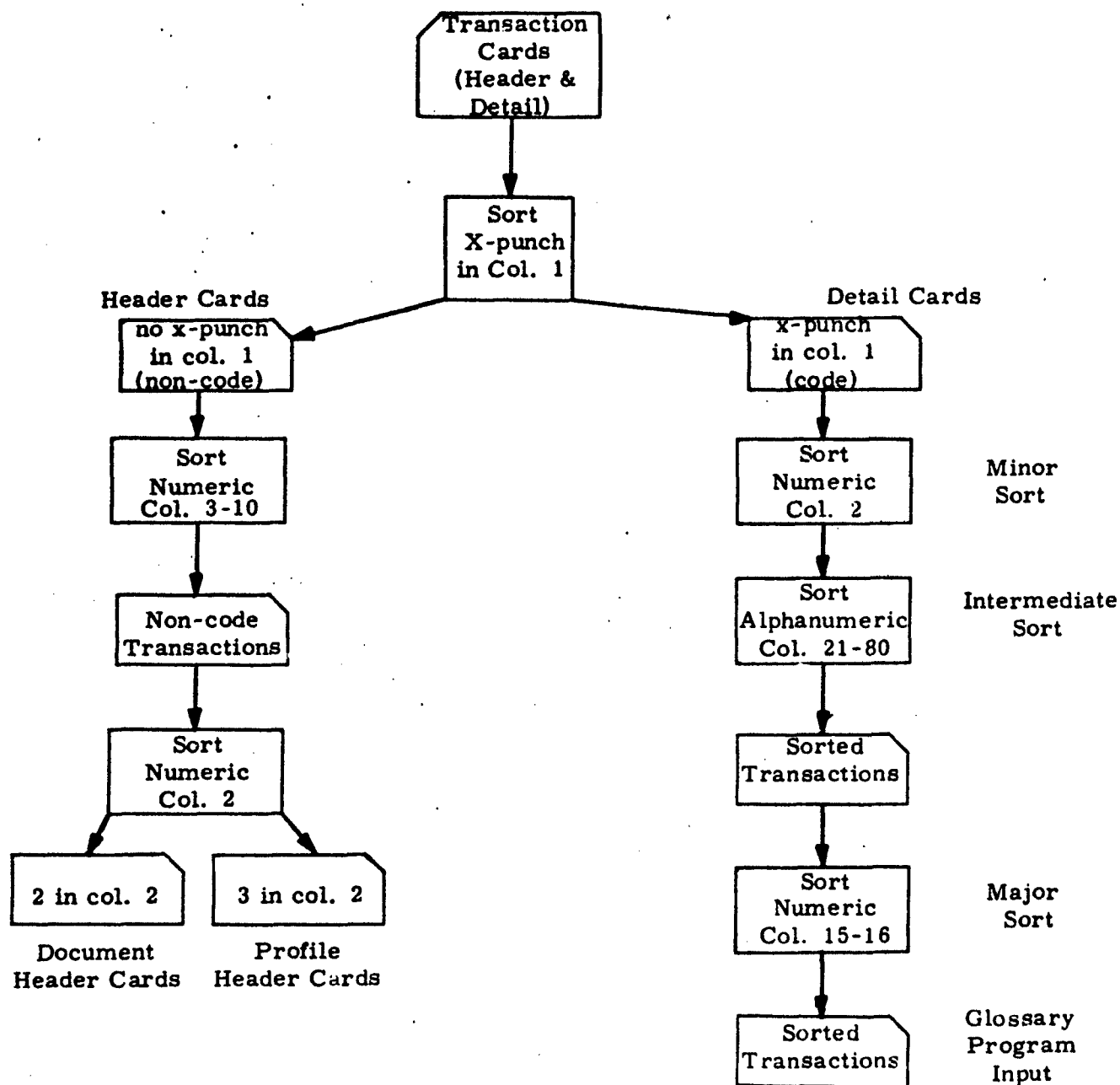


Figure 39 Glossary Input Card Processing

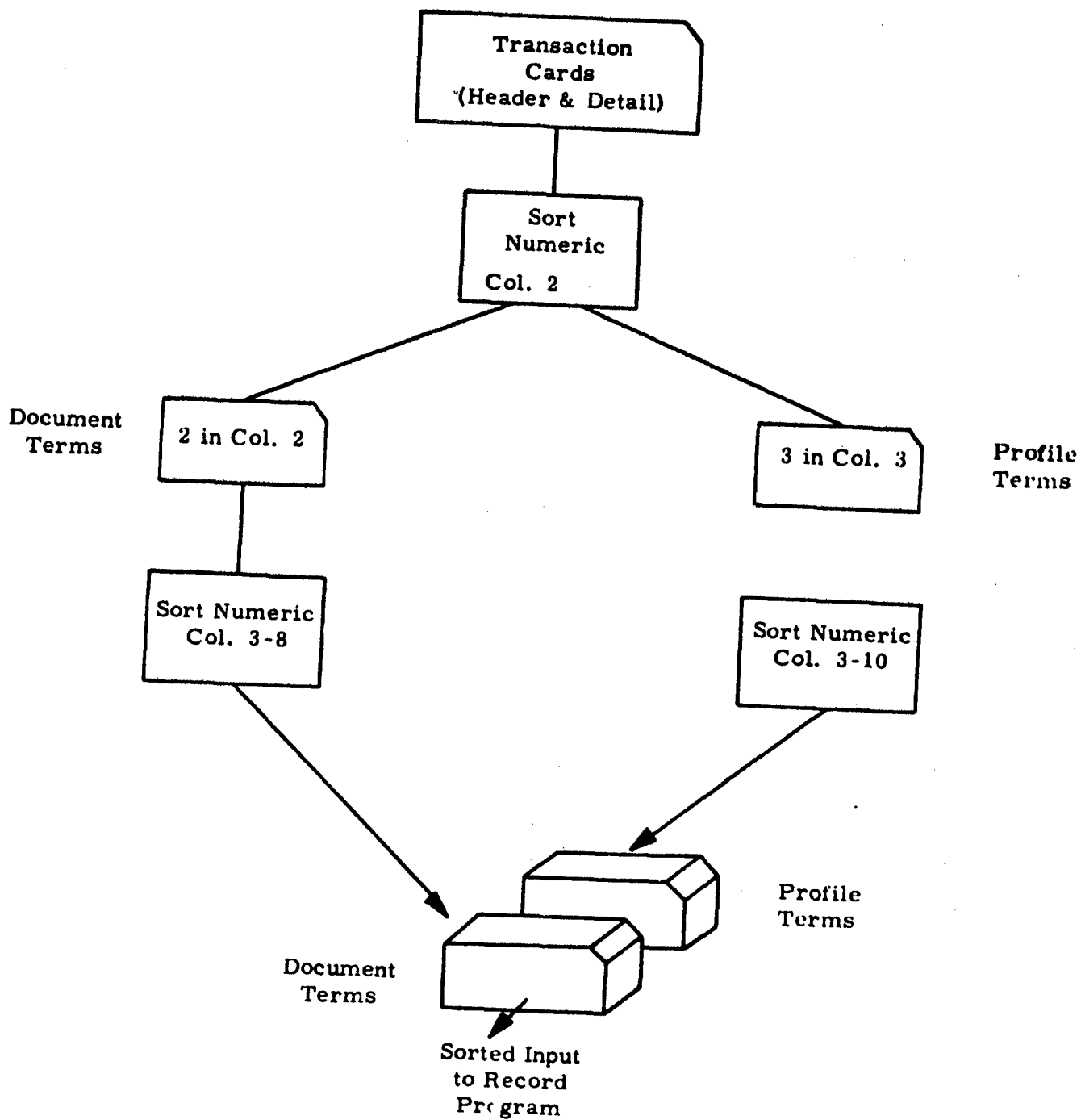


Figure 40 Record and Match Input Card Processing

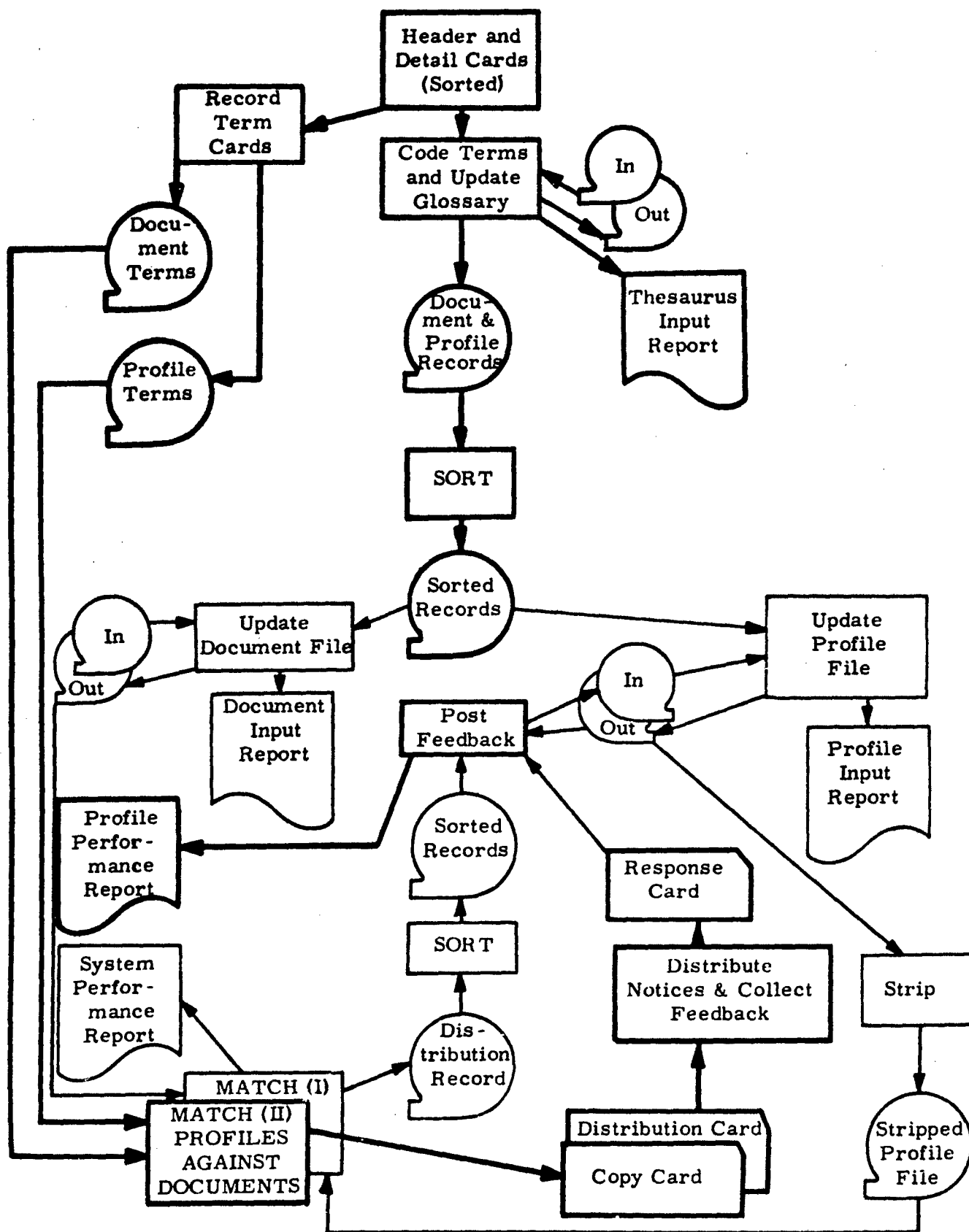


Figure 41 Integrated Information System Data Flow

one single stream. All cards are read into the glossary program which monitors the validity of the input card formats, builds the control vocabulary, validates the spelling of terms assigned to subscriber profiles and documents, and assigns a four-digit code to each document and profile term. The glossary program acts as the gateway to all subsequent computer programs. Output of the glossary program is a new glossary tape updated by term cards in the input stream, a transaction tape containing coded terms and header cards for documents and profiles, and two listings produced on the high-speed printer and typewriter console. The high-speed printer output constitutes a current listing of the glossary. Error messages are printed out on the on-line typewriter to indicate reasons for input card rejection and to instruct the computer operator. The transaction tape is in a format suitable for input to other programs, which might be used to build document files and subscriber files for use in support of other information services.

Document and profile transaction cards are processed by a separate computer program described below, which records the document and profile terms on two separate magnetic tapes. These tapes are input to a third program which matches the document and profile terms and punches instructions for distributing the selected information to each participant.

The system is designed so that when a full complement of information services is implemented the Match I program can accept inputs from the updated document and profile files. Currently the Match II program accepts tapes generated by the record program.

All computer programs currently use plug 1 for controlling tape handlers. This assignment is made in the Data Description Section of the programs. All programs are written in the GECOM compiler language which is closely compatible with COBOL. The binary object deck must be loaded by means of the GE MCML loader. The sequence of card input is: MCML loader deck, followed by binary object deck, followed by data deck, followed by last card, followed by two blank cards.

2. Operation of the Glossary Program (Listing in Appendix A)

As shown in Figure 42, the glossary program has two inputs. Card input consists of glossary terms, document descriptions, and glossary profiles. Preprocessing of these cards is described in Section IV A 7. Magnetic tape input consists of the previous issue of the glossary tape. As this tape is read during processing a new glossary tape is generated. A second tape output contains the document descriptions and subscriber profiles which have been verified and coded by means of the glossary. As the

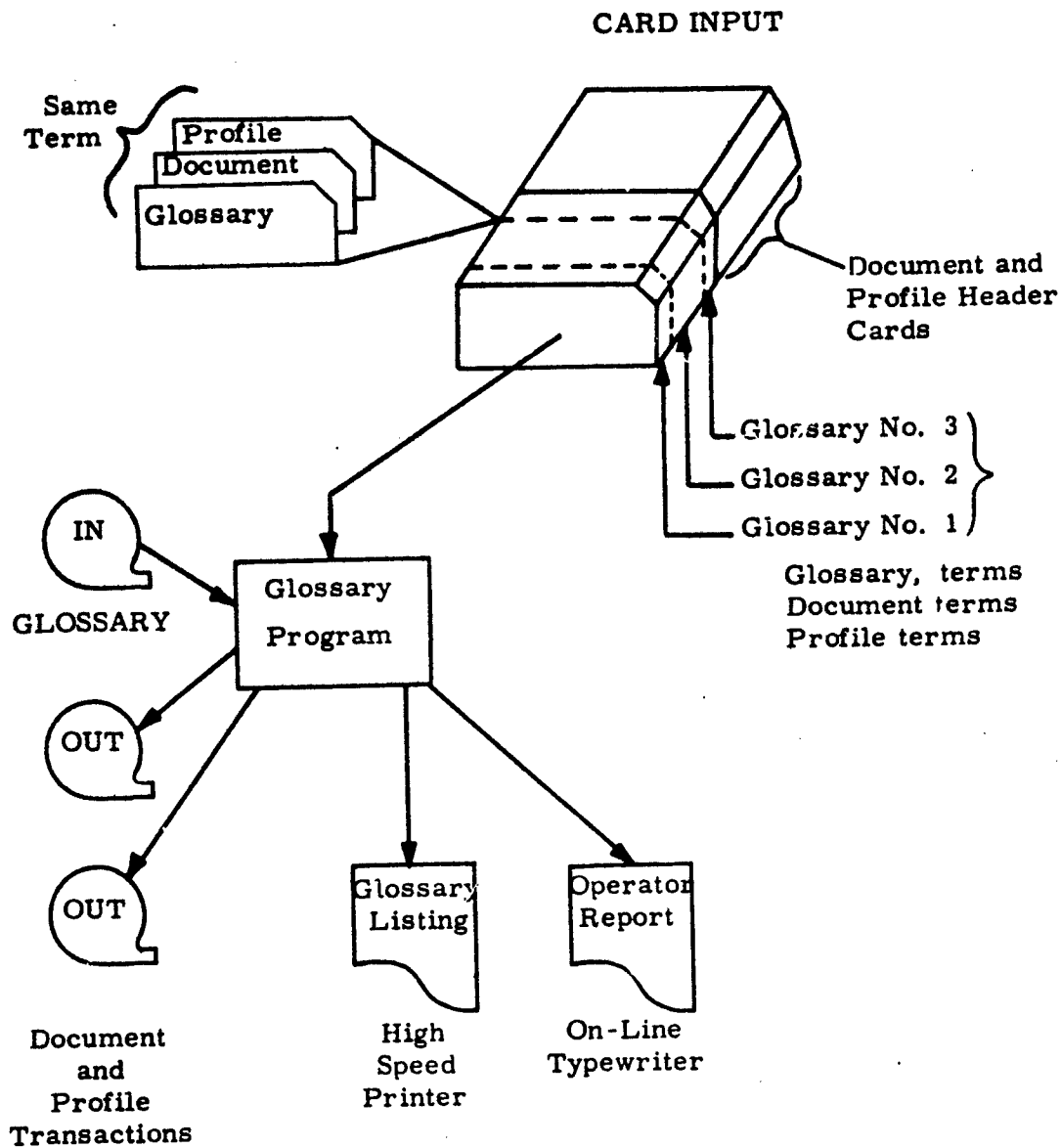


Figure 42 Glossary Program

program creates the glossary and transaction tapes, a glossary listing is produced on the high-speed printer. The operator is instructed to perform certain operations by means of the on-line typewriter, which prints a report shown in Figure 43.

The operator will be supplied with instructions on setting console switches 1 through 5. If the operator is directed to set console switch 2 in the OFF position, he should load the previous edition of the glossary tape on tape transport 1. If he is directed to set console switch 4 to the OFF position, he should load a scratch tape on tape transport 2 to hold the new edition of the glossary. If he is directed to set console switch 5 in the OFF position, he should also load a scratch tape on tape transport 3, which will constitute the transaction tape generated in the course of card processing.

On reading in the program source deck, the computer will execute a programmed halt following the typing of the message "SET CONSOLE SWS." The setting of console switches should be checked to comply with instructions and sense switch zero should be toggled to continue. Before continuing, however, the input card deck should be in the card reader and the last card in the input deck should be checked to ensure that it says "last card," starting in column 1.

After sense switch zero is toggled, the program will restart and commence processing of input cards. The glossary input tape and glossary and transaction output tapes should move as cards are read. Concurrently, the high-speed printer should print the glossary listing, an example of which is shown in Figure 5. During the course of processing, additional messages might be printed on the on-line typewriter. Each message should be prefaced by the letter E followed by a number 1 through 5 and a string of characters.

When processing is completed, the magnetic tapes will rewind and the typewriter will print out the messages I WANT MORE INPUT and EXCHANGE TAPES 1 AND 2. Exchanging the tape assignments, that is, switching tape 1 to tape 2 and tape 2 to tape 1, makes the original input glossary a scratch tape to accept a new glossary and makes the glossary tape just created an input to be updated in the next cycle. If the operator is instructed to process additional card decks through the glossary program, the program can be restarted by toggling sense switch zero. If a new pattern of sense switch settings is required for a subsequent run, the settings should be made before toggling sense switch zero.

SET CONSOLE SWC } Call for switch setting at beginning
 S1 OFF } of program.
 S2 OFF }
 S3 OFF } Switch settings during run.
 S4 OFF }
 S5 OFF }
 E4 }
 C2 J 1 07400001 0000 07 4020 URO CARBON }
 E1 J 3 00002901 1229 07 URO CARBON }
 C2 J 1 07511201 0000 07 5112 SIBILITY }
 E1 J 3 00002701 2229 07 SIBILITY }
 C2 J 1 07603301 0000 07 6033 ENCL-FORMA }
 E2 J 1 07782201 0000 07 7822 ALE CORRE }
 E1 J 2 00001702 0000 07 ALE CORRE }
 CC 000000 }
 R1 TO 0010000000000000 }
 R1 TO 0010000000000000 } GE operating system messages.
 LC 000000 }
 I WANT THE LIGHT }
 EXCHANGE TAPE 1 AND 2 } Call for additional input, tape exchange
 SET CONSOLE SWC } and resetting of console switches.

Figure 43 Interpretation of Operator Instructions

The typewriter and high-speed printout should be delivered to the library along with the deck of punched cards. The magnetic tape on transport 2 should be saved as the latest version of the glossary tape. If requested, the transaction tape should also be saved.

If operation of the program is abnormal, the sense switch settings might be incorrect. These settings can be checked by following these guidelines:

1. Leave control switch 1 in the OFF position unless there is no card input
2. Leave control switch 2 in the OFF position unless
a) a new glossary card is being built from card input,
or b) none of the input cards contained a J or K in column 1

NOTE: Control switches No. 1 and 2 cannot both be on.

3. Leave control switch 3 in the OFF position unless a glossary list is not desired
4. Leave sense switch 4 in the OFF position unless none of the input cards contains a J or K in column 1
5. Leave sense switch 5 in the OFF position unless none of the input cards contains a 2 or 3 in column 2.

If excessive messages are printed on the on-line typewriter, card sequencing can also be checked to determine whether they are in the proper order (see Section IV. A. 7).

3. Operation of the Record Program (Listing in Appendix B)

As shown in Figure 44, input to the Record program consists of punched cards. The program creates two magnetic tapes and prints error messages on the on-line typewriter. Scratch tapes should be loaded on transports 1 and 2.

The last card in the data deck should contain an L in column 2. Load these cards behind the binary source deck. After the source deck is read, the program will commence reading cards and recording on tapes

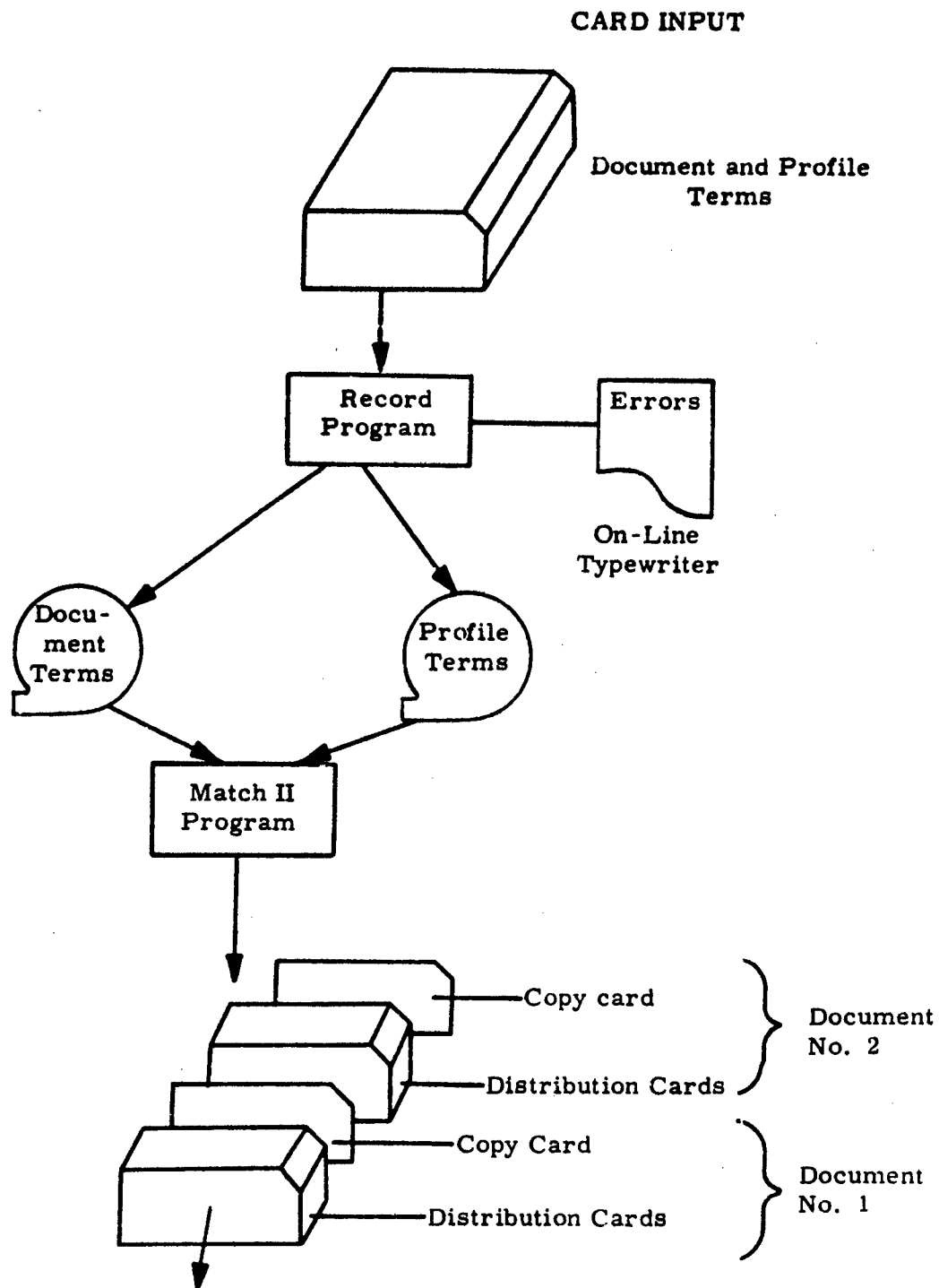


Figure 44 Record and Match Programs

1 and 2. Cards containing a 2 in column 2 are written on tape unit 1. Cards containing a 3 are written on tape unit 2. A card containing an L in column 2 will terminate the run and rewind both tapes. If column 2 contains neither a 2, a 3, nor an L, then columns 3 through 8 of the card are printed on the on-line typewriter. This list should be delivered to the library.

4. Operation of the Match Program (Listing in Appendix C)

As shown in Figure 44, the tapes generated as output from the Record program are subsequently used as input to the Match II program. The tapes should be mounted on transports 1 and 2. Output from the Match program is a punched card deck, a sample of which is listed in Figure 45.

During operation of the program, a block of data will be read from tape 1. All record blocks on tape 2 will then be read. During the reading of tape 2 blocks, two or more cards may be punched. When the end of the tape 2 file is reached, tape 2 will rewind and a new data block will be read from tape 1. This process repeats until the end of the tape 1 file is reached. During each program cycle, it is expected that at least two cards will be punched. Although cards may not be punched in any one cycle, some cards should be punched during a string of consecutive cycles. If the program punches no cards during the first five minutes of operation, the original input to the Record program should be checked for card sequencing on columns 2 through 3 (see Section IV. A. 8). The card output should be processed as directed in Section IV. A. 5.

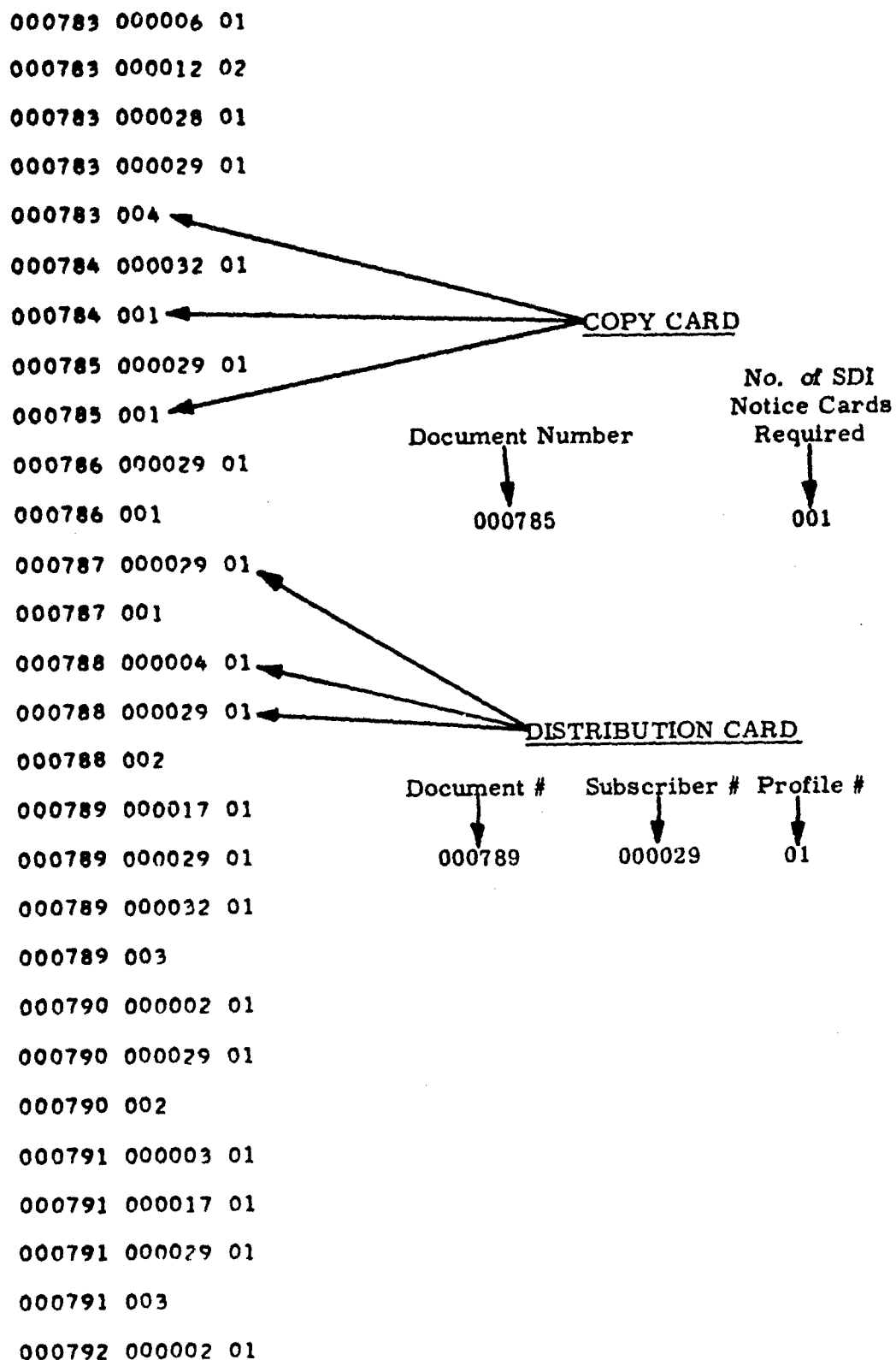


Figure 45 Copy and Distribution Card Listing
in Output Sequence

APPENDIX A
GLOSSARY PROGRAM

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000100	IDENTIFICATION DIVISION.	
000200	PROGRAM ID. GLOSS.	
000300	AUTHOR. W A BIVONA.	
000400	INSTALLATION. INFO DYNAMICS CORP.	
000500	ENVIRONMENT DIVISION.	
000600	OBJECT COMPUTER. 225 MEMORY SIZE 4 MODULES 1 CR 1 CP 1 HSP 6 MT	
000700	PUACE MAIN SEGMENT IN LOWER MEMORY.	
000800	FILE CONTROL. SELECT ALL CARDS IN ASSIGN TO CR SELECT OLD GLOSSARY ASSI	
000810	TO MT 1 SELECT NEW GLOSSARY ASSIGN TO MT 2 SELECT TRANSACTIONS ASSI	
000820	TO MT 3 SELECT GLOSSARY ASSIGN TO HSP.	
001000	DATA DIVISION.	
002000	TRUE FALSE SECTION. LOWFROMTAPE LOWFROMCARDS ADD TERM END OF CARDS	
003000	END OF TAPE FIRST CARD NOCARDS IN NOTAPE IN	
004000	NOLIST ALL NOCOPY TAPE NOTRANS TAPE	
006000	FILE SECTION.	
007000	OUTPUT FILES.	
008000	FD NEW GLOSSARY.	
008100	R BGN TAR LABL	
008200	LABEL IDENT	#WORDGLOSS#
008300	DATE CREATED	\$MODYR
0084 0	R END FILE LABL	
009000	R FROM MENTERM	
010000	F MN GLOSSARY	XX
011000	F MN CODE	X 4
012000	F MN TERM	X 60
0130 0	F MN FREQ	9999
014000	FD TRANSACTIONS.	
014100	R BGN TAR LABL	
014200	LABEL IDENT	#TRANSACTS#
014300	DATE CREATED	\$MODYR
014400	R END FILE LABL	
015000	R CODED TERMS	
015500	F CARDTRL	X
016000	F CC ACTION	X
017000	F CC FILE	X
018000	F CC RECORD	X 8
019000	F CC FREQ	XXXX
020000	F CC GLOSSARY	XX
021000	F MN CODE	X 4
022000	F CC TERM	X 60
023000	R UNCODED CARD	
023500	F CARDTRL	X
024000	F CC ACTION	X
025000	F CC FILE	X
026000	F CC RECORD	X 8
027000	F CC FREQ	XXXX
028000	F CC GLOSSARY	XX
029000	F CC CODE	XXXX
030000	F CC TERM	X 60
031000	FD GLOSSARY.	
031100	R TERM LABEL	
031200	U	#K FREQ CODE GL TERM#
032000	R TERM ENTRY	
033000	F KIND	XB
034000	F MN FREQ	ZZZ9
035000	F MN CODE	BX 4
036000	F MN GLOSSARY	BXX

```

037000  R MN TERM
057000  R TOTAL LABEL
058000  U
059000
060000
061000  R TOTALS
062000  R TOT CODED
063000  R TOT NONC
064000  R TOT ADD
065000  F TOT DELETE
066000  F TOT MOOS
067000  F TOT NORIND
068000  R TOT SEQ
069000  F TOT FORMAT
070000  INPUT FILES.
071000  FD ALL CARDS DN.
072000  R CODE CARD
073000  F CC ACTBON
074000  O END CARDS DN
075000  O CODE ADD
076000  O CODE OBL
077000  O ADD IT
078000  O DELETE IT
078500  C CHANGE IT
079000  F CC FILE
080000  O GLOSS CARD
081000  C DOO CARD
082000  O PRO CARD
083000  F CC RECORD
083500  B CARDNO
084000  R CC FREQ
085000  R CC GLOSSARY
086000  R CC CODB
087000  F CC TERM
087500  E CC TELU
088000  E CC TERM 10
090000  FD OLD GLOSSARY.
090100  R BGN TAR LABL
090200  LABEL IDENT
090300  DATE CREATBD
090400  R END FILE LABL
091000  R MAXIMUM TERM
092000  F MX GLOSSARY.
093000  R MX CODB
094000  R MX TERM
094500  E MX TELU
095000  R MX FREQ
096000  WORKING STORAGE SECTION.
096500  R CARDROL
097000  F KIND
099000  R TOT CODED
100000  F TOT NONC
101000  R TOT ADD
102000  F TOT DELETE
103000  F TOT MOOS
104000  F TOT NORIND
105000  R TOT SEQ

```

BX 60

**ZZZZ
888ZZZ
888ZZZ
888ZZZ
888ZZZ
888ZZZ
888ZZZ
888ZZZ**

X
部L部
部J部
部K部
部1部
部2部
部3部

X
1
2
3
X 8

07 08
XXXX
XX
XXXX
X 60

01 01
01 10

#WORDGLOSS#
\$MODYR

XX
XXXXX
X 60

01 01
9999

X
X

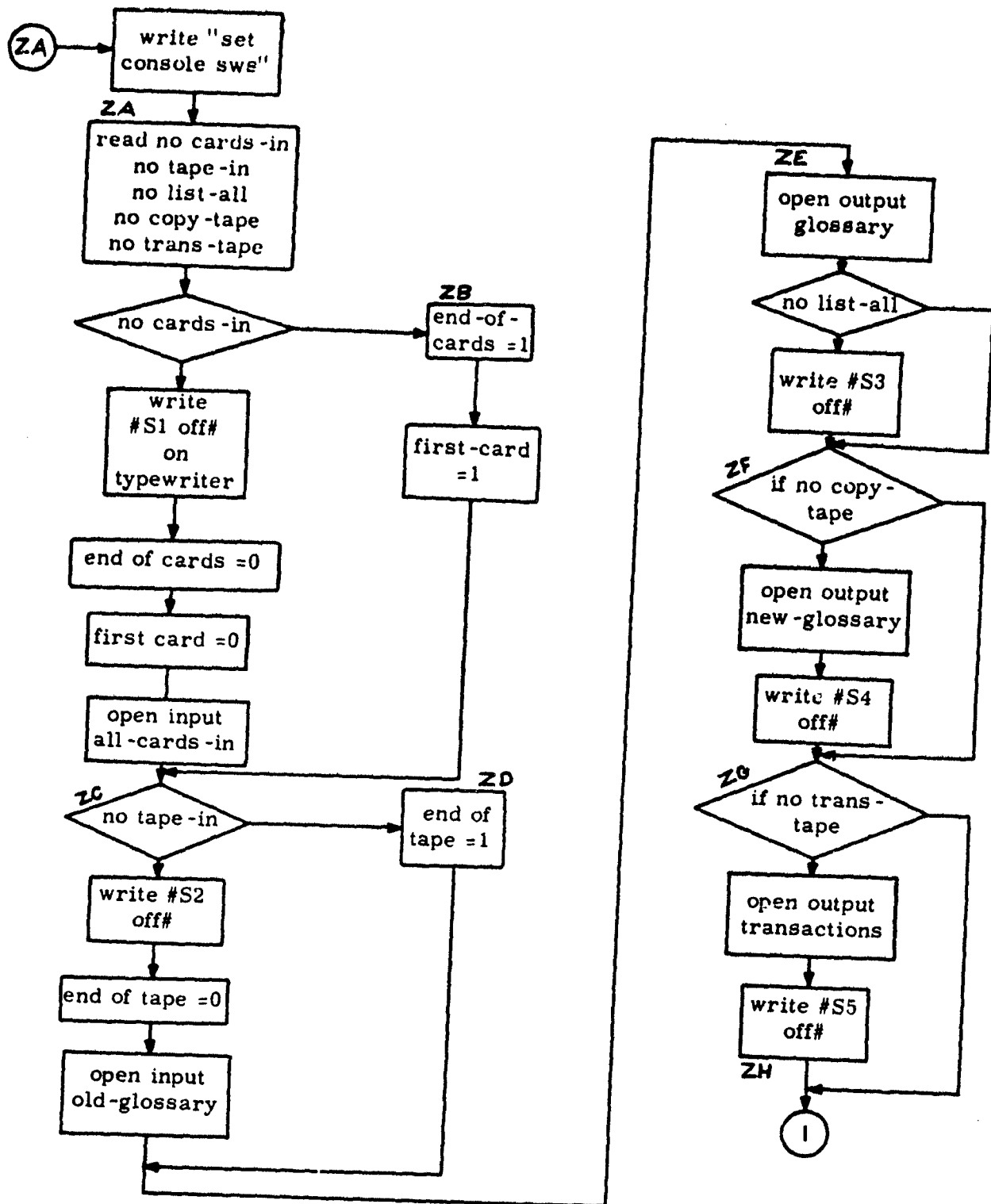
9999
4999
9999
9999
9999
9999
9999

106000	R TOT FORMAT	9999
107000	R MINIMUM TERM	
108000	F MN GLOSSARY	XX
109000	F MN CODE	XXXX
110000	F MN TERM	X 60
110500	E MN TELU	
111000	F MN FREQ	01 01
112000	R TERM SAVE	9999
114000	R TS GLOSSARY	XX
115000	R TS TELL	X
116000	CONSTANT SECTION.	
121000	FU CON5	#E#
122000	FU CON6	#-#
123000	FU CON7	# #
124000	FU CON8	#X#
125000	FU CON9	55
126500	PROCEDURE DIVISION.	
127000	GUOSS POST SECTION.	
128000	BEGINJ	
129000	IF NOT LOWFROMTAP8 GO TO MA.	
130000	WRITE FROM MINTERM RECORDJ	
131000	IF LOWFROMCARDS GO TO KB.	
132000	IF NOLIST ALL GO TO KC.	
133000	MOVE QON7 TO KINDJ	
134000	KD. WRITE TERM ENTRY RECORD ADVANGING 2 LINESJ	
134100	IF LINE COUNT LS QON9 GO TO KC.	
134200	ADVANCE GUOSSARY TO TOP OF PAGE.	
134300	WRITE TERM LABEL RECORD ADVANGING 3 LINES.	
135000	GO TO KC.	
136000	KB. MOVE QON8 TO KINDJ	
136500	TOT MODS TOT MODS & 1.	
137000	GO TO KD.	
138000	KA. IF NOT LOWFROMCARDS GO TO KC.	
139000	IF ADD TERM GO TO KE.	
140000	MOVE QON6 TO KINDJ	
141000	TOT DELETB TOT DELETE&1.	
142000	GO TO KD.	
143000	KE. WRITE FROM MINTERM RECORDJ	
144000	MOVE QON5 TO KINDJ	
14500	TOT ADD TOT ADD&1J	
146000	GO TO KD.	
147000	KC. END GUOSS POST SECTION.	
148000	ZA. WRITE #SER CONSOLE SMS# ON TYPEWRITER.	
149000	RBAD NOCARDS IN NOTAPE IN NOLIST ALL NOCORY TAPE NOTRANS TAPE	
149500	FROM CONTROL SWITCHESJ	
150000	IF NOCARDS IN GO TO ZB.	
151000	WRITE #S1 OFF# ON TYPEWRITER.	
152000	END OF CARDS 0.	
152500	FDRST CARD 0J	
153000	OREN INPUT ALL CARDS IN.	
154000	GO TO ZC.	
155000	ZB. END OF CARDS 1.	
155500	FDRST CARD 1.	
156000	ZC. IF NOTAPE IN GO TO ZD.	
157000	WRITE #S2 OFF# ON TYPEWRITER.	
158000	END OF TAPE 0.	
159000	OREN INPUT OLD GLOSSARY.	

160000 GO TO ZE.
 161000 ZD. END OF TAPE 1.
 162000 ZE. OPEN OUTPUT GLOSSARY.
 163000 IF NOLIST ALL GO TO ZR.
 164000 WRITE #S3 OFF# ON TYPEWRITER.
 165000 ZR. IF NOCOPY TAPE GO TO ZG.
 166000 OPEN OUTPUT NEW GLOSSARY.
 167000 WRITE #S4 OFF# ON TYPEWRITER.
 168000 ZG. IF NOTRANS TAPE GO TO ZH.
 169000 OPEN OUTPUT TRANSACTIONS.
 170000 WRITE #S5 OFF# ON TYPEWRITER.
 171000 ZH. LOWFROMCARDS 0.
 171500 LOWFROMTAPE 0.
 171505 MOVE 2 TO TOT COBDO TOT NONC TOT ADD TOT DELETE TOT MODS.
 171510 MOVE 0 TO TOT NOFIND TOT SEQ TOT FORMAT.
 171515 MOVE 0 TO MN FREQ.
 171520 MOVE #0# TO MN GLOSSARY MN CODE MN TERM.
 171525 MOVE #0# TO TS GLOSSARY TS TELL.
 171530 ADVANCE GLOSSARY TO TOP OF PAGE.
 171535 WRITE TERM LABEL RECORD ADVANCING 3 LINES.
 172000 IF END OF TAPE GO TO AB.
 173000 AA. READ OLD GLOSSARY RECORD, IF END FILE GO TO JA.
 174000 AB. IF FIRST CARD GO TO AB.
 175000 AQ. READ ALL CARDS IN RECORD.
 176000 IF END CARDS IN GO TO JB.
 176500 IF GLOSS CARD GO TO PA.
 176600 IF CODE ADD OR ADD IT OR DELETE IT OR CHANGE IT GO TO PV.
 176700 GO TO JV.
 176800 PV. IF DOC CARD GO TO PB.
 176900 IF PRO CARD GO TO PC.
 177000 GO TO JV.
 177100 PA. IF CODE ADD OR CODE DEL GO TO PZ.
 177200 GO TO JV.
 177300 PB. IF CARDNO EQ #00# GO TO JV.
 177400 IF CARDNO EQ #01# GO TO PS.
 177500 IF CARDNO EQ #90# GO TO PT.
 177600 MOVE #J# TO CARDTROL.
 177700 GO TO PZ.
 177800 PS. MOVE #I# TO CARDTROL.
 177900 GO TO PZ.
 178000 PR. MOVE #K# TO CARDTROL.
 178100 GO TO PZ.
 178200 PQ. IF CARDNO EQ #00# GO TO PU.
 178300 MOVE #M# TO CARDTROL.
 178400 GO TO PZ.
 178500 PU. MOVE #L# TO CARDTROL.
 178600 GO TO PZ.
 182000 PZ. IF ADD IT OR DELETE IT OR CHANGE IT GO TO JW.
 183000 FIRST CARD 1.
 184000 IF CC GLOSSARY GR TS GLOSSARY GO TO AD.
 185000 IF CC GLOSSARY LS TS GLOSSARY GO TO JS.
 187000 IF CC TELU LS TS TELL GO TO JS.
 189000 AD. MOVE OC GLOSSARY TO TS GLOSSARY.
 190000 MOVE OC TELL TO TS TELL.
 192000 AE. IF END OF CARDS GO TO JD.
 193000 IF END OF TAPE GO TO AF.
 194000 IF CC GLOSSARY GR MX GLOSSARY GO JE.

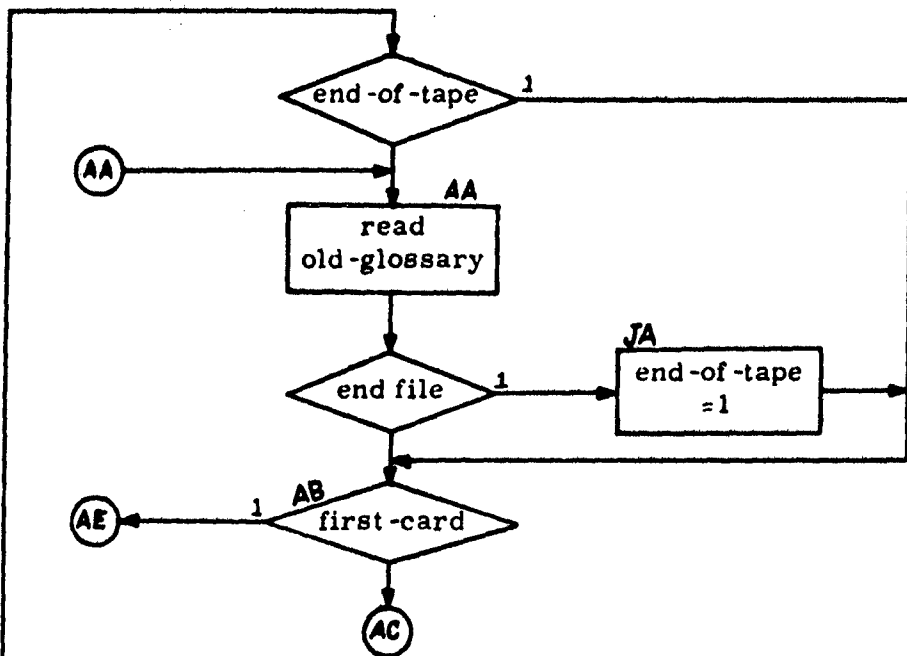
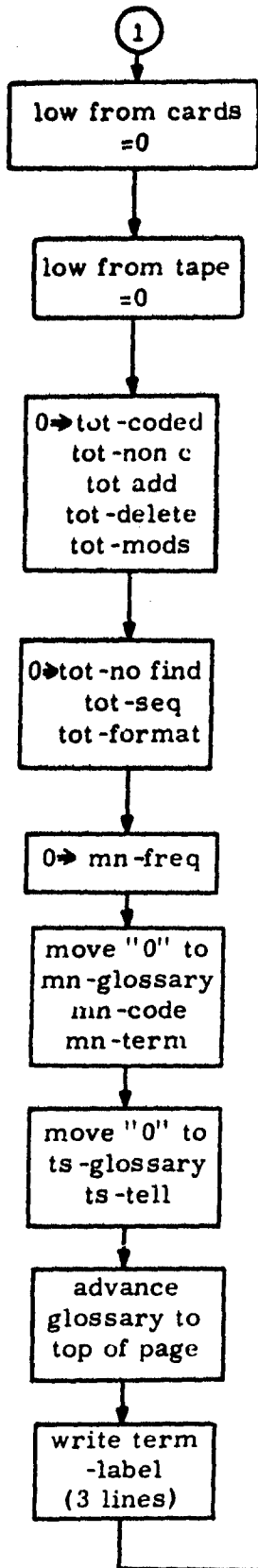
194010 IF CC GLOSSARY LS MX GLOSSARY GO TO AF.
 194020 IF NOT GLOSS CARD GO TO JM.
 194030 IF CC CODE GR MX CODE GO TO JB.
 194040 IF CC CODE LS MX CODE GO TO AG.
 194050 IF NOT CODE ADD GO TO JL.
 194060 PERFORM GUOSS POST SECTION.
 194062 MOVE MX GUOSSARY TO MN GLOSSARY.
 194064 MOVE MX CODE TO MN CODE.
 194066 MOVE OC TERM TO MN TERM.
 194068 MOVE OC FREQ TO MN FREQ.
 194070 LOWFROMTARE 1.
 194072 GO TO JP.
 194090 JK. IF CC GLOSSARY EQ MN GLOSSARY AND CC TERM EQ MN TERM GO TO JHJ
 194100 IF CC TELL GR MX TELL GO TO JE.
 194110 IF CC TELL LS MX TELL GO TO JM.
 194120 GO TO JE.
 194130 JL. PERFORM GUOSS POST SECTION.
 194135 MOVE MAXIMUM TERM TO MINIMUM TERMJ
 194136 LOWFROMTARE 0.
 194140 ADD TERM 0.
 194150 JP. LOWFROMCARDS 1.
 194160 FIRST CARD 0.
 194170 GO TO AA.
 194180 AF. IF GLOSS CARD GO TO AG.
 194190 IF CC GLOSSARY EQ MN GLOSSARY AND CC TERM EQ MN TERM GO TO JHJ
 194200 GO TO JM.
 194210 AG. IF NOT CODE ADD GO TO JM.
 194220 IF CC GLOSSARY EQ MN GLOSSARY GO TO AJ.
 194230 GO TO JC.
 205000 AJ. IF CC CODE NOT GREATER THAN MN CODE GO TO JO.
 206000 JO. PERFORM GUOSS POST SECTION.
 207000 MOVE OC FREQ TO MN FREQ.
 208000 MOVE OC GUOSSARY TO MN GLOSSARY.
 209000 MOVE OC CODE TO MN CODE.
 210000 MOVE OC TERM TO MN TERM.
 211000 AK. LOWFROMTAPE 0.
 212000 LOWFROMCARDS 1.
 212500 ADD TERM 1.
 213000 GO TO AC.
 214000 JA. END OF TAPE 1.
 215000 GO TO AB.
 216000 JB. END OF CARDS 1.
 216500 FIRST CARD 1.
 217000 GO TO AE.
 220000 JO. IF END OF TAPE GO TO JF.
 221000 JE. PERFORM GUOSS POST SECTION.
 222000 MOVE MAXIMUM TERM TO MINIMUM TERMJ
 223000 LOWFROMTAPE 1.
 224000 LOWFROMCARDS 0.
 225000 GO TO AA.
 226000 JF. PERFORM GUOSS POST SECTION.
 227000 ADVANCE GUOSSARY TO TOP OF PAGE.
 228000 WRITE TOTAL LABEL RECORD.
 229000 WRITE TOTALS RECORD.
 230000 IF NOCARDS IN GO TO EA.
 231000 CUOSE ALL CARDS IN.
 232000 EA. IF NOTAPE IN GO TO EBJ

233000 CUOSE OLD GLOSSARY WITH NO LOCK.
 234000 EB. IF NOCOPY TAPE GO TO EC.
 235000 CLOSE NEW GLOSSARY WITH NO LOCK.
 236000 EQ. IF NOTRANS TAPE GO TO ED.
 237000 CLOSE TRANSACTIONS WITH NO REWIND.
 238000 ED. CUOSE GLOSSARY.
 239000 WRITE #I WANT MORB INPUT# ON TYPEWRITER.
 239100 WRITE #EXQHANGE TAPES 1 AND 2# ON TYPEWRITER.
 239200 GO TO ZA.
 241000 JH. IF PRO CARD GO TO JI.
 242000 MN FRBQ MN FREQ & 1.
 243000 JB. TOT CODED TOT CODED & 1.
 244000 WRITE CODED TBMS RECORD.
 245000 GO TO AC.
 261000 JH. TOT NOFIND TOT NOFIND & 1.
 262000 WRITE #E1 # CC ACTION CC FILE CC RECORD CC FREQ CC GLOSSARY CC CODE
 263000 OC TBMS 10 ON TYPEWRITER.
 264000 GO TO AC.
 265000 JO. TOT SBQ TOT SEQ & 1.
 266000 WRITE #E2 # CC ACTION CC FILE CC RECORD CC FREQ CC GLOSSARY CC CODE
 267000 OC TBMS 10 ON TYPEWRITER.
 268000 GO TO AC.
 269000 JS. TOT SBQ TOT SEQ & 1.
 270000 WRITE #E3 # CC ACTION CC FILE CC RECORD CC FREQ CC GLOSSARY CC CODE
 271000 OC TERM 10 ON TYPEWRITER.
 272000 GO TO AC.
 273000 JV. TOT FORMAT TOT FORMAT & 1.
 274000 WRITE #E4 # CC ACTION CC FILE CC RECORD CC FREQ CC GLOSSARY CC CODE
 274500 OC TBMS 10 ON TYPEWRITER.
 274600 GO TO AC.
 276000 JW. TOT NONC TOT NONC&1.
 277000 WRITE UNCODED CARD RECORD.
 278000 GO TO AC.
 279000 END PROGRAM.

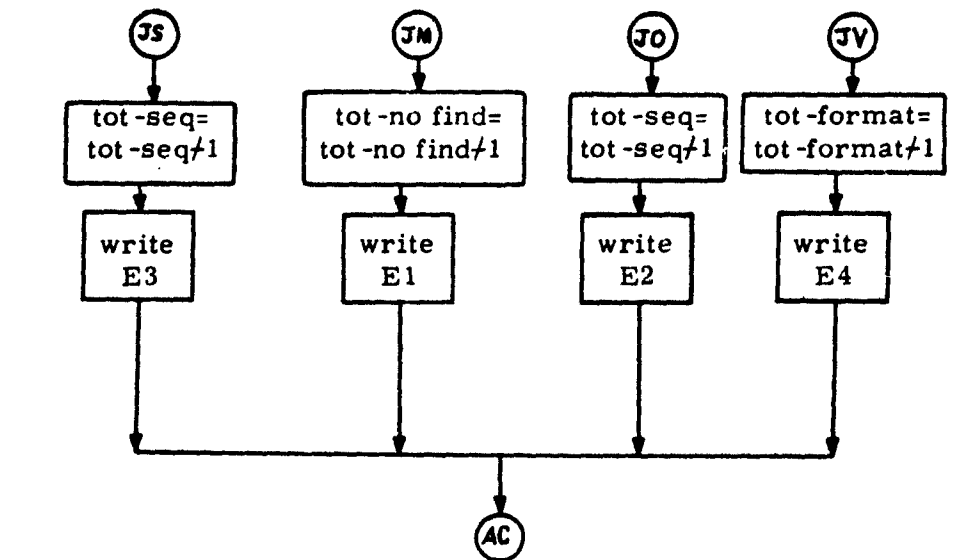


GLOSSARY PROGRAM

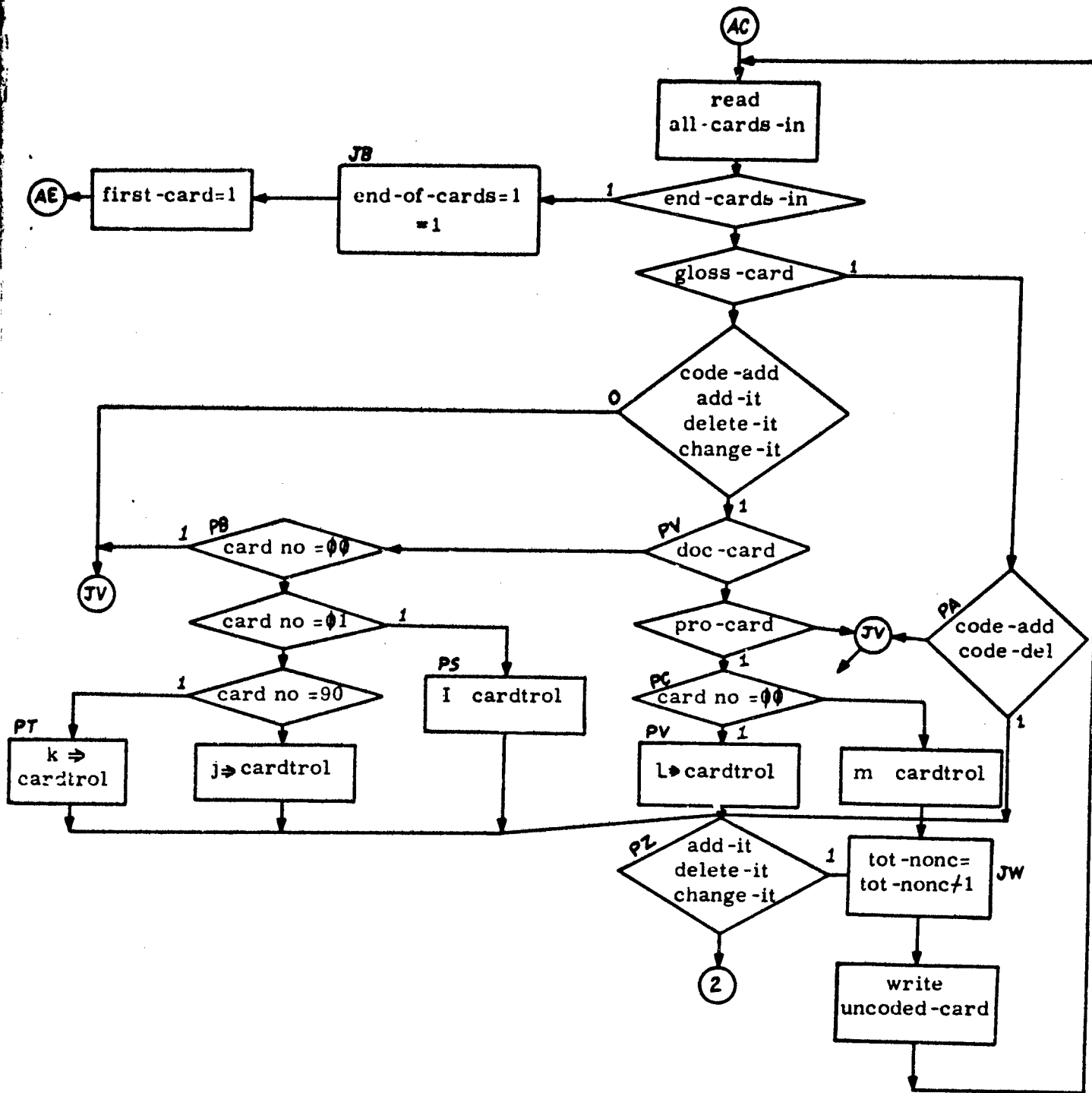
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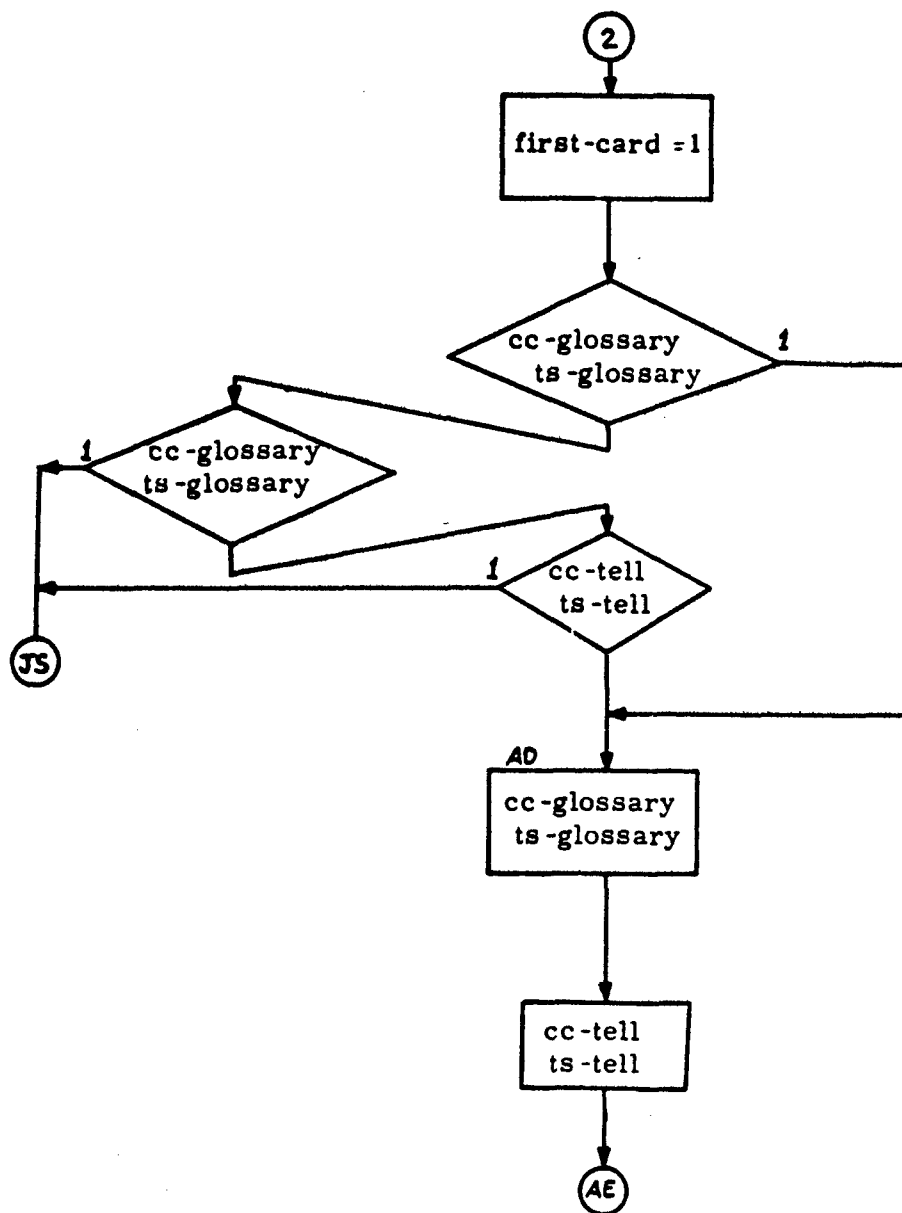


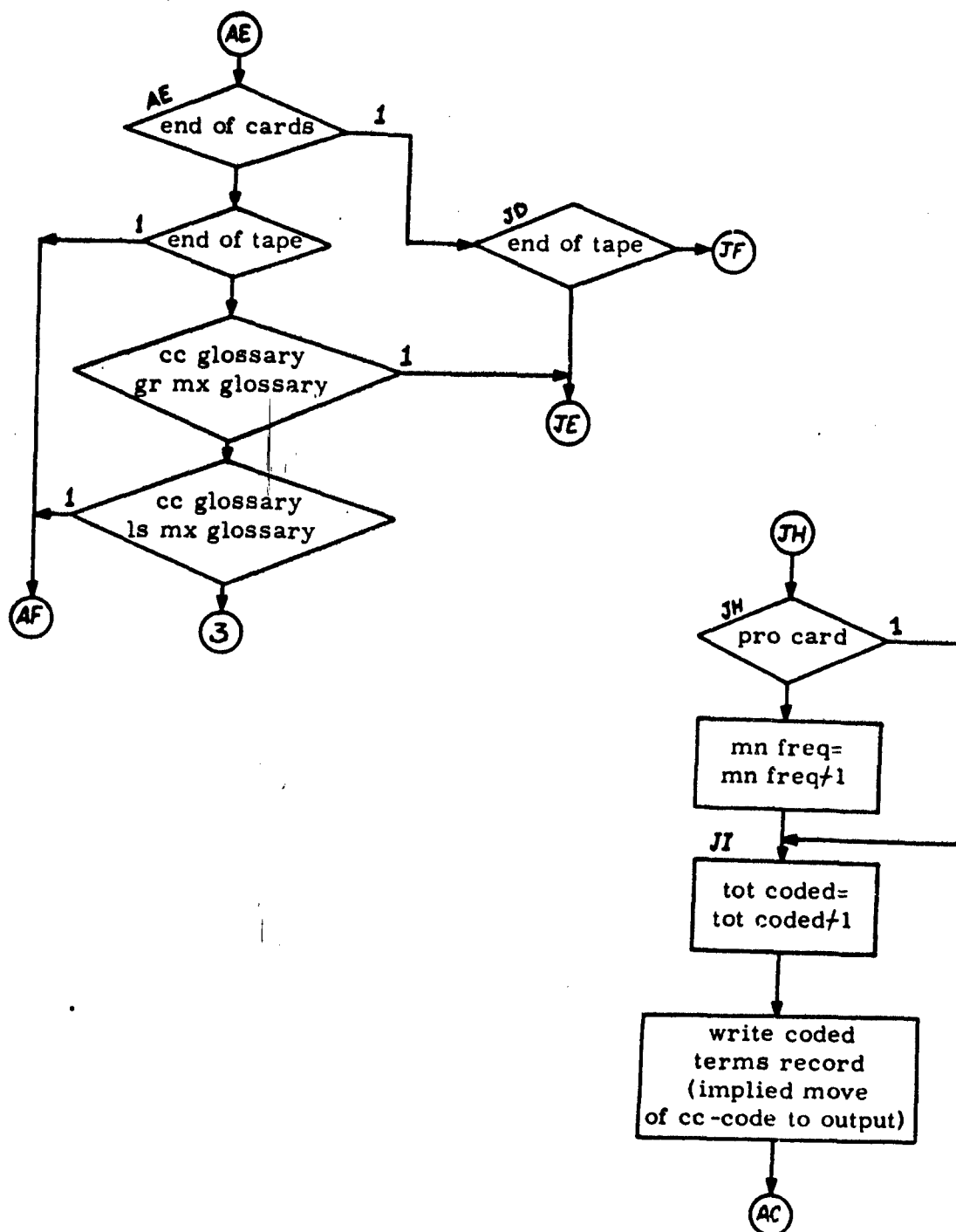
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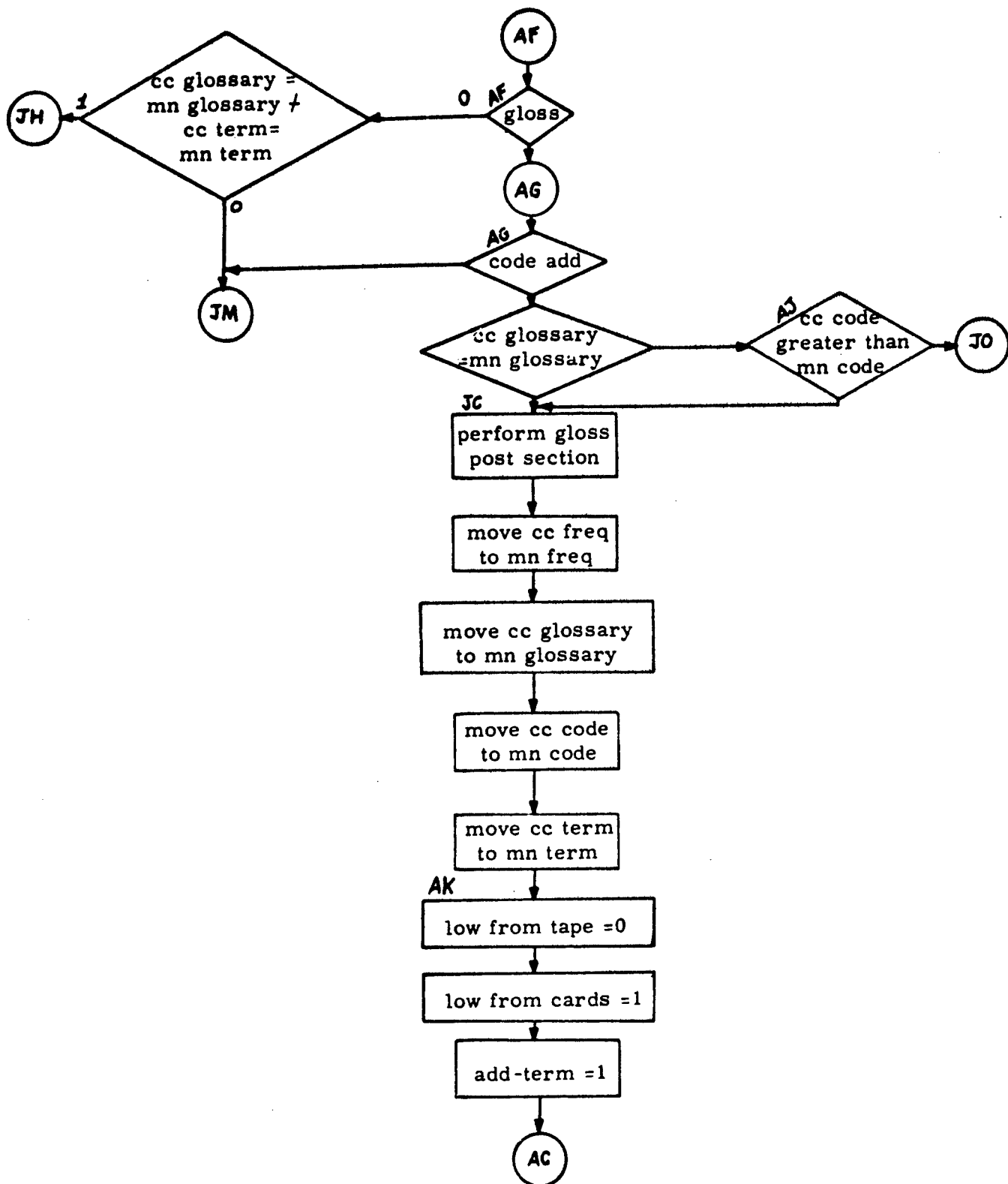


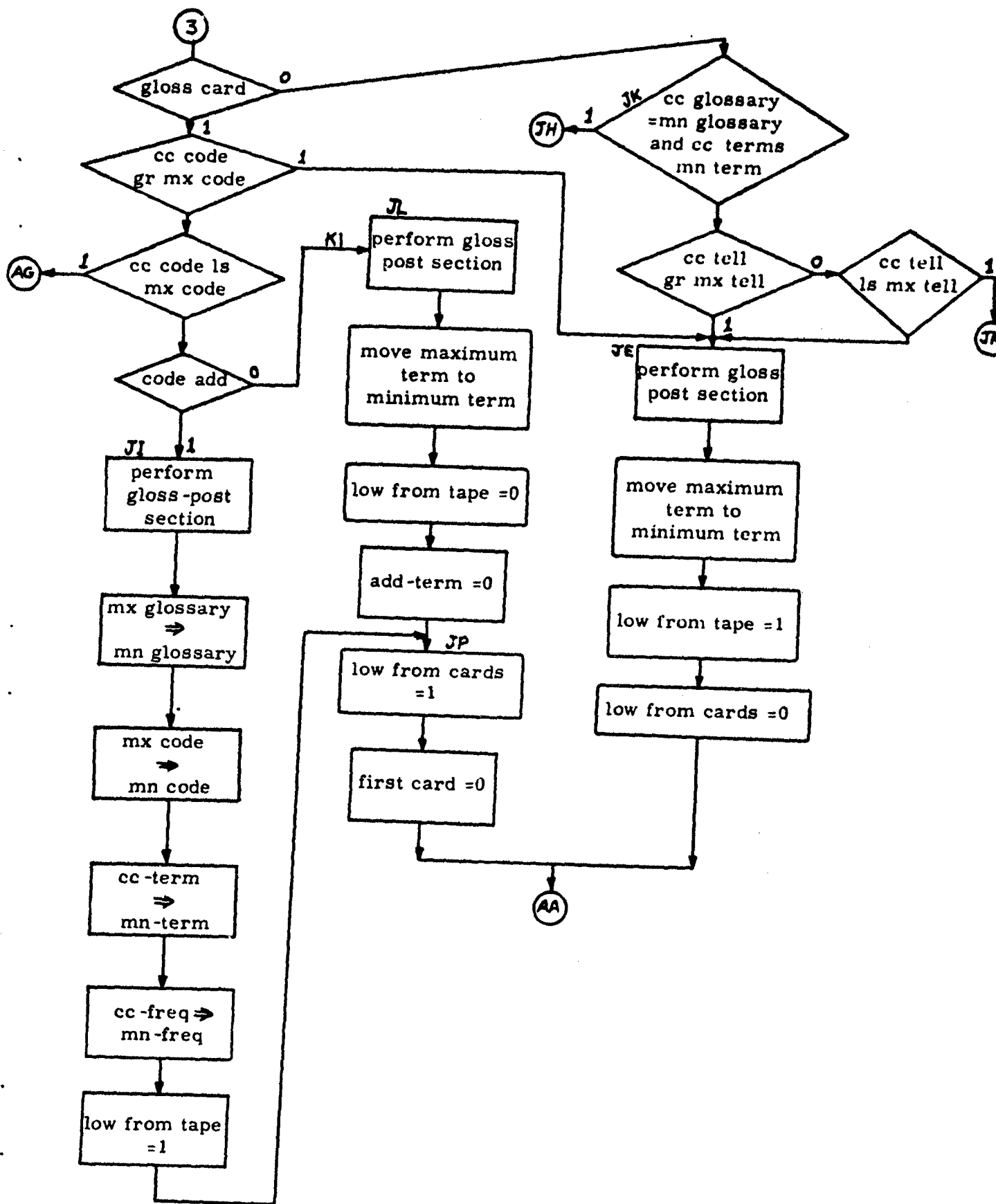
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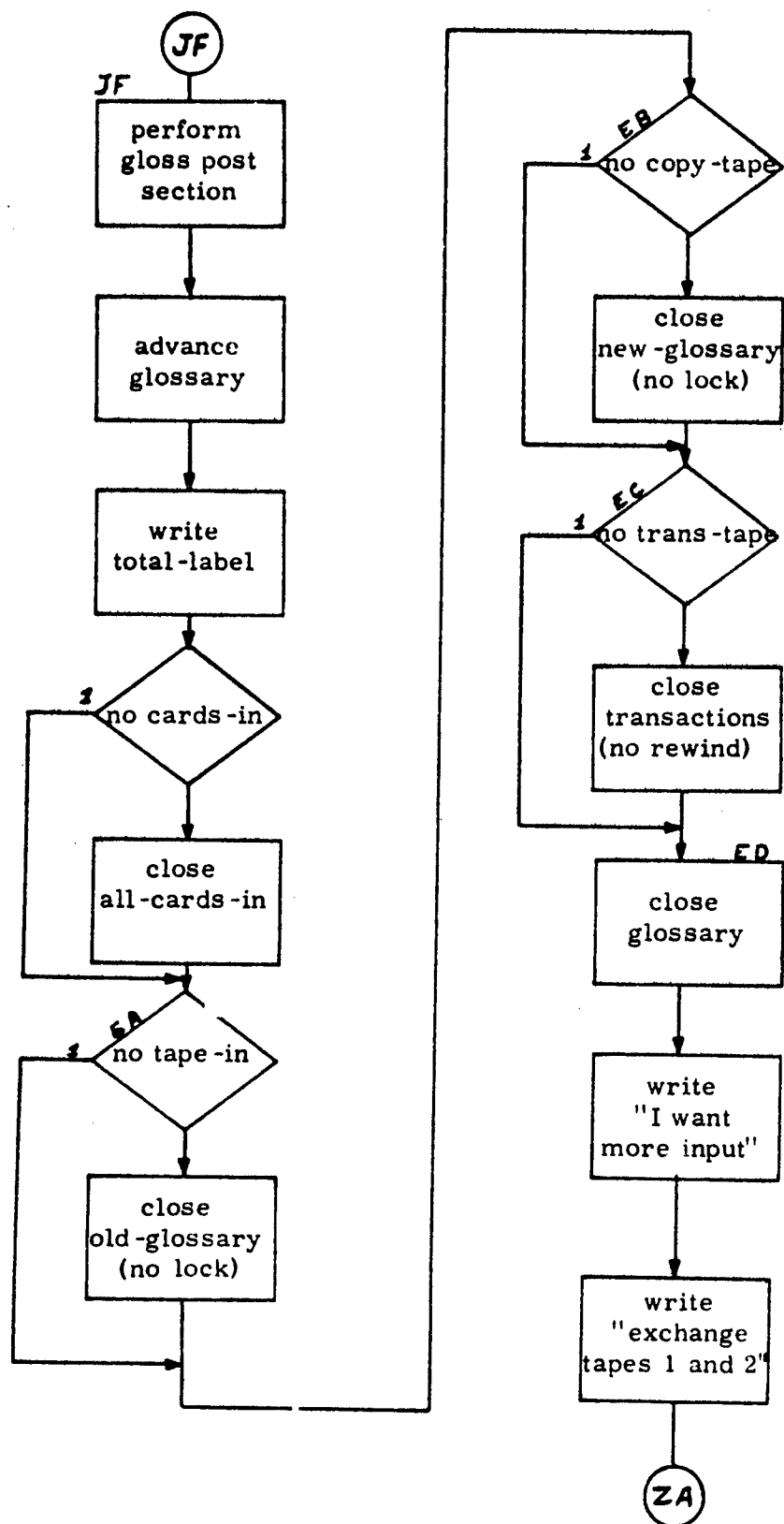


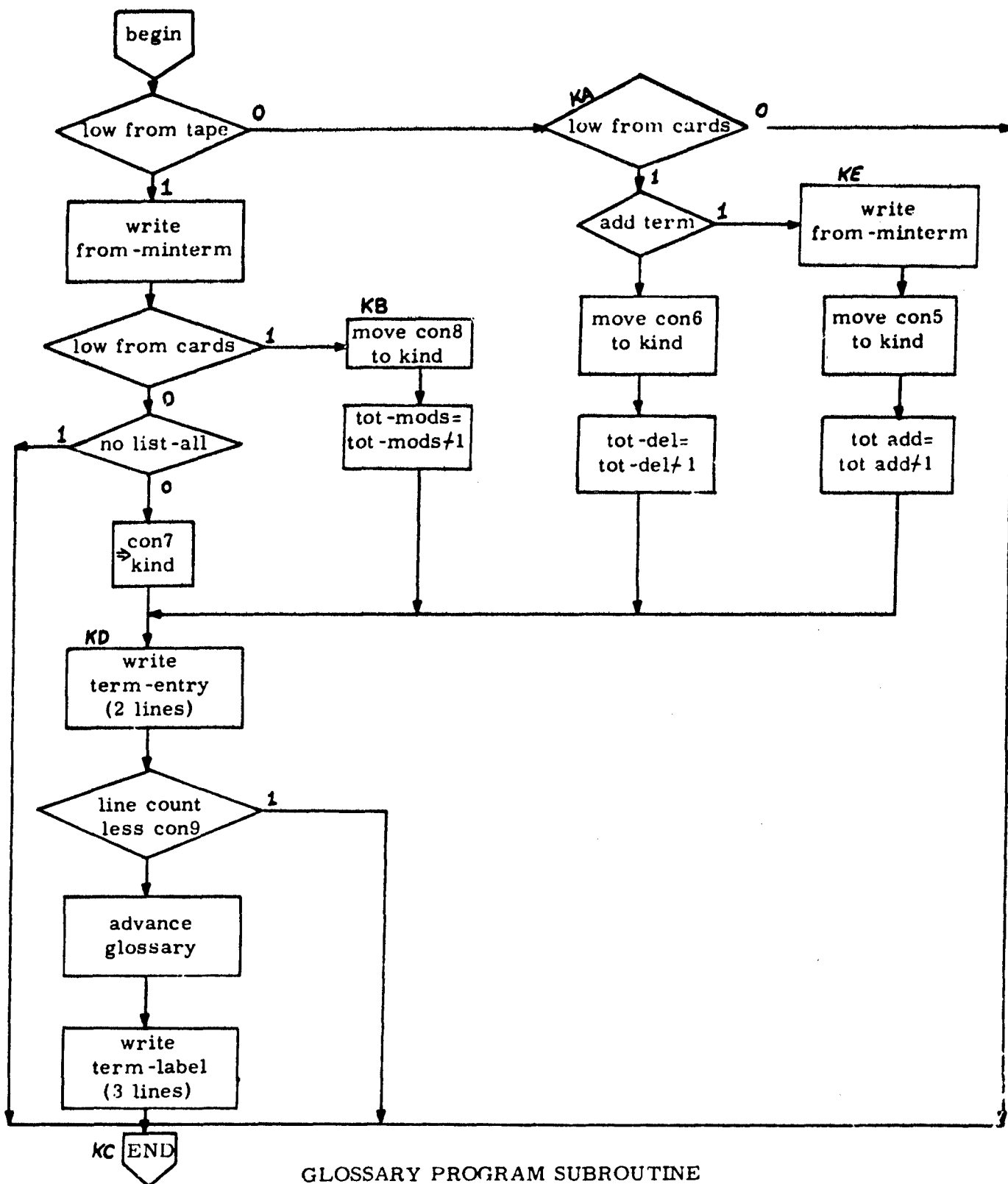










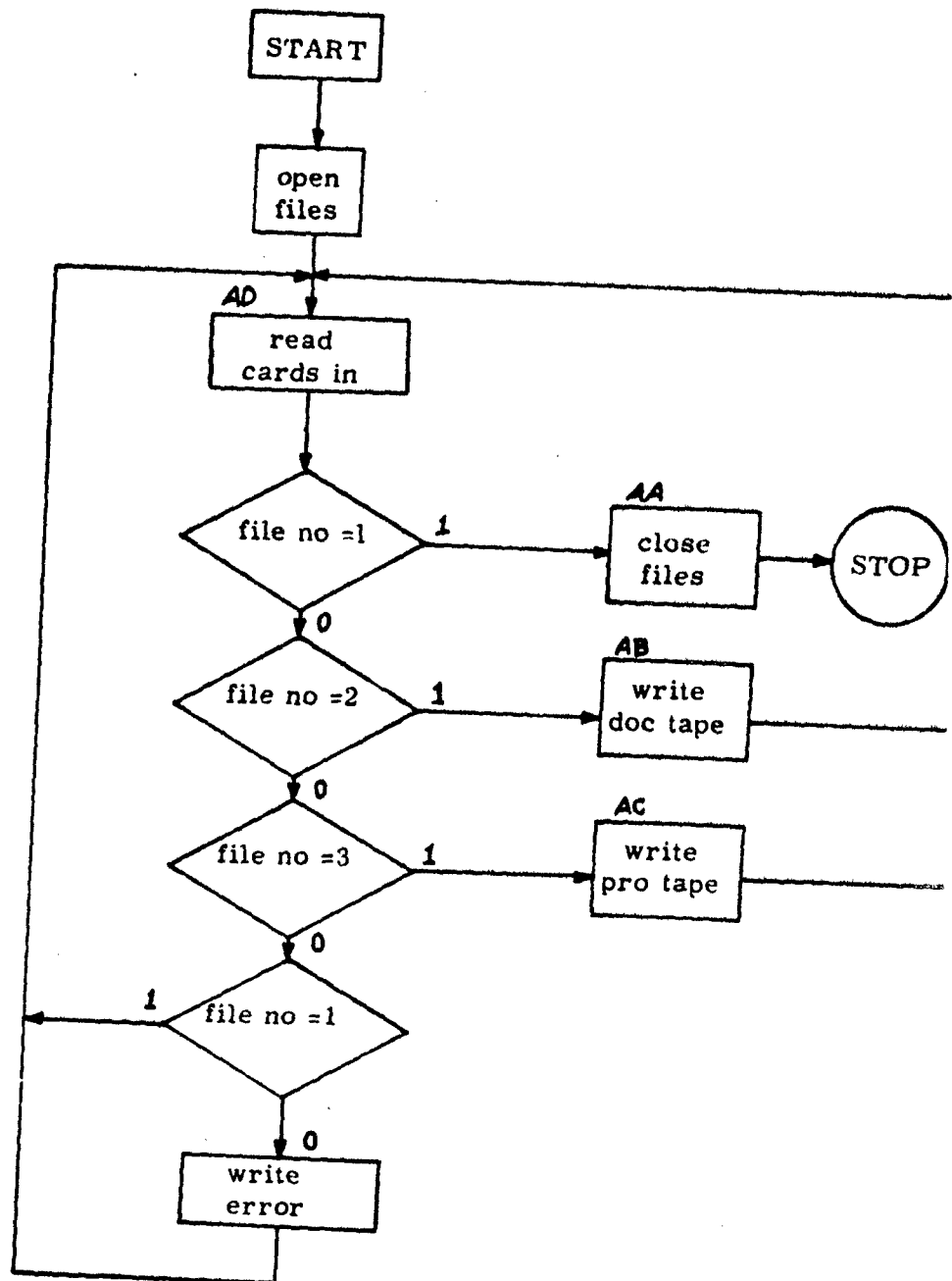


GLOSSARY PROGRAM SUBROUTINE
(GLOSS-POST SECTION)

APPENDIX B
RECORD PROGRAM

001000 IDENTIFICATION DIVISION.
 002000 PROGRAM ID. RECORD.
 003000 AUTHOR. W A RIVONA.
 004000 INSTALLATION. INFO DYNAMICS CORP.
 005000 ENVIRONMENT DIVISION.
 006000 OBJECT COMPUTER. 225 MEMORY SIZE 4 MODULES 1 CR 1 CP 1 HSP 6 MT
 007000 PUACE MAIN SEGMENT IN LOWER MEMORY.
 008000 FILE CONTROL. SELECT CARDSIN ASSIGN TO CR SELECT DOCTAPC ASSIGN TO MT 1
 008100 SBLECT PROTAPC ASSIGN TO MT 2.
 009000 DATA DIVISION.
 010000 FILE SECTION.
 011000 OUTPUT FILES.
 012000 FD DOCTAPO BLOCK CONTAINS 480 WORDS.
 012100 R BGN TAP LABL
 012200 LABEL IDENT #DOCTAPE#
 012300 DATE CREATED \$MOOYR
 012400 R END FIL LABL
 013000 R DOCTAPE
 014000 F RECNO X 6
 015000 F CODE XXXX
 016000 F GLOSSARY XX
 017000 F TERM X 60
 017100 FD PROTAPC BLOCK CONTAINS 494 WORDS.
 017200 R BGN TAP LABL
 017300 LABEL IDENT #PROOTAPE#
 017400 DATE CREATED \$MOOYR
 017500 R END FIL LABL
 018000 R PROTAPC
 019000 F RECNO X 6
 020000 F PROFILE XX
 021000 F LEVWT XXXX
 022000 F CODE XXXX
 023000 F GLOSSARY XX
 024000 F TERM X 60
 025000 INPUT FILES.
 026000 FD CARDSIN.
 027000 R DOCPROS
 028000 F FIRSTLY X
 029000 F FILENO X
 030000 F RECNO X 6
 031000 F PROFILE XX
 032000 F LEVWT XXXX
 033000 F GLOSSARY XX
 034000 F CODE XXXX
 035000 F TERM X 60
 036000 PROCEDURE DIVISION.
 037000 OREN INPUT CARDSIN.
 038000 OPEN OUTPUT DOCTAPC.
 038100 OREN OUTPUT PROTAPC.
 039000 AD. READ CARDSIN RECORD.
 040000 IF FILENO EQ #1# GO TO AAJ
 041000 IF FILENO EQ #2# GO TO ABJ
 042000 IF FILENO EQ #3# GO TO ACJ
 043000 IF FILENO EQ #1# GO TO ADJ
 044000 WRITE RECNO OF CARDSIN ON TYPEWRITER.
 045000 GO TO AD.
 046000 AA. CLOSE CARDSIN.

047000 CUOSE DOCTAPC.
047100 CUOSE PROTPAC.
048000 STOP RUN.
049000 A8. WRITE DOCTAPE RECORD.
050000 GO TO AD.
051000 AC. WRITE PROTAPE RECORD.
052000 GO TO AD.
053000 END PROGRAM.



RECORD PROGRAM

APPENDIX C
MATCH PROGRAM

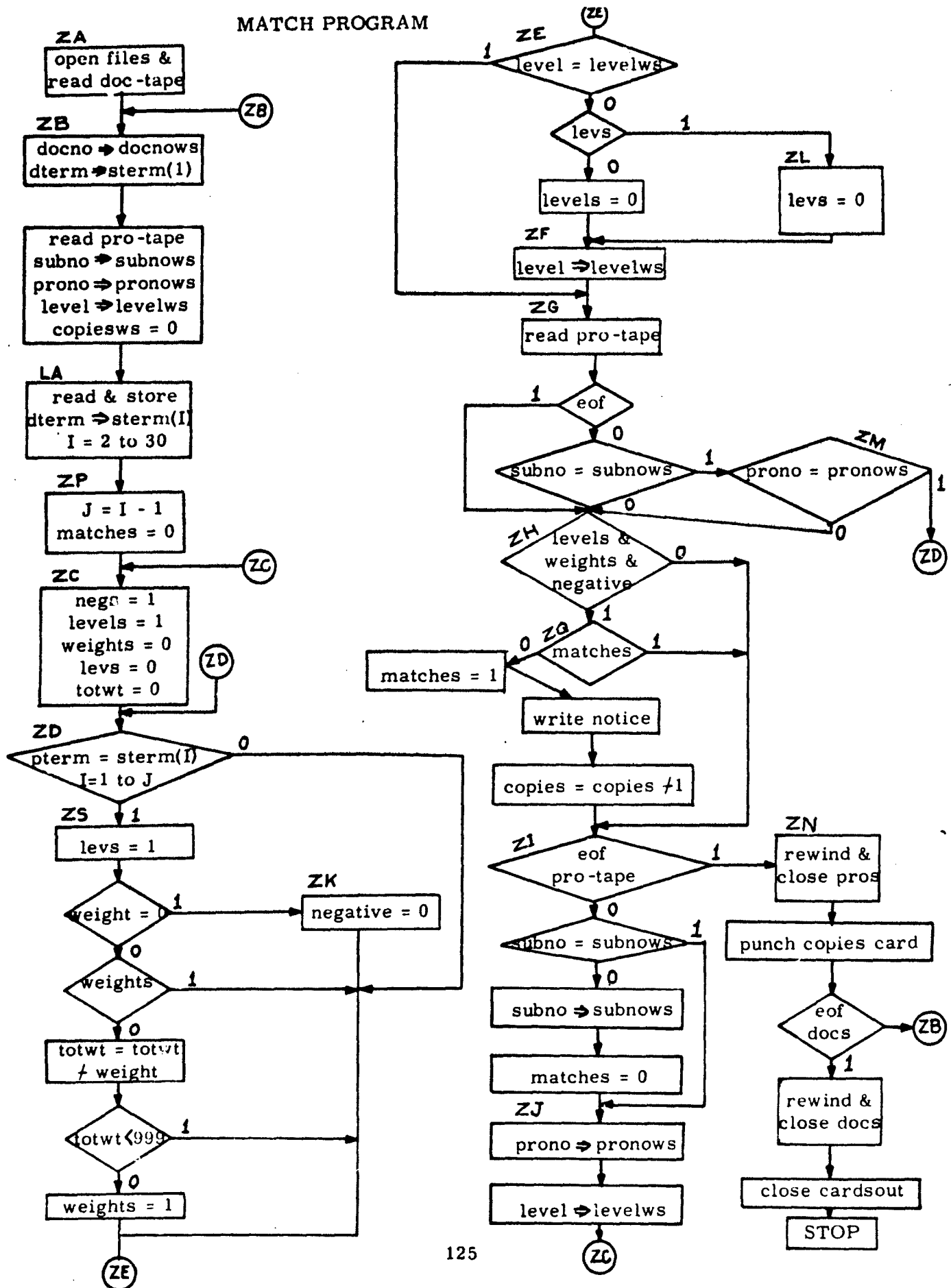
001000	IDENTIFICATION DIVISION.	
002000	PROGRAM IO. MATCH.	
003000	AUTHOR. W A BLVONA.	
004000	INSTALLATION. INFO DYNAMICS.	
005000	ENVIRONMENT DIVISION.	
006000	OBJECT COMPUTER. 225 MEMORY SIZE 4 MODULES 1 CR 1 CP 1 HSP 6 MT	
007000	PLACE MAIN SEGMENT IN LOWER MEMORY.	
008000	FILE CONTROL. SELECT CARDSOUT ASSIGN TO CP SELECT DOCTAPE ASSIGN TO MT	
009000	SELECT PROTAPE ASSIGN TO MT 2.	
010000	DATA DIVISION.	
011000	TRUE PALS SECTION. LEVELS WEIGHTS NEGS LEVS MATCHES.	
012000	FILE SECTION.	
013000	OUTPUT FILES.	
014000	FD CARDSOUT.	
015000	R NOTICE	
016000	F DOCNOWS	X 6
017000	F SUBNOWS	BX 6
0180 0	6 PRONOWS	BXX
019000	R DUREORDER	
020000	F DOCNOWS	X 6
021000	F COPIES	8999
022000	INPUT FILES.	
023000	FD DOCTAPE BLOCK CONTAINS 480 WORDS.	
023100	R BGN TAR LABL	
023200	LABEL IDENT	#DOCTAPE#
023300	DATE CREATED	\$MODYR
023400	R END FIL LABL	
024000	R DOOS	
025000	F DOONO	X 6
026000	F DCODE	XXXX
027000	F DTERM	X 22
028000	F DCONT	X 40
029000	FD PROTAPE BLOCK CONTAINS 494 WORDS.	
029100	R BGN TAR LABL	
029200	LABEL IDENT	#PROOMTAPE#
029300	DATE CREATED	\$MODYR
029400	R END FIL LABL	
030000	R PROS	
031000	F SUBNO	X 6
032000	F PRONO	XX
033000	F LEVEL	X
034000	F WEIGHT	999
035000	F PCODE	XXXX
036000	F PTERM	X 22
037000	F PCONT	X 40
038000	WORKING STORAGE SECTION.	
039000	F COPIES	999
040000	F DOONOWS	X 6
041000	F SUBNOWS	X 6
042000	F PRONOWS	XX
043000	F LEVELWS	X
044000	F I	99
045000	F J	99
046000	F TOTWT	9999
047000	F STERM	X 22
048000	PROCEDURE DIVISION.	
049000	ZA. OPEN INPUT DOCTAPE.	

030

050000 OREN OUTPUT CARDSOUT.
 051000 READ DOCTAPE RECORD.
 052000 ZB. MOVE DOCNO TO DOCNWS.
 053000 MOVE DTERM TO STERM 1 .
 054000 OREN INPUT PROTAPE.
 055000 READ RROTAPE RECORD.
 056000 MOVE SUBNO TO SUBNWS.
 057000 MOVE RRONO TO PRONWS.
 058000 MOVE LLEVEL TO LEVELWS.
 059000 MOVE ZEROS TO COPIES.
 060000 LA. VARY B FROM 2 BY 1 UNTIL B IS GREATER THAN 30.
 061000 READ DOCTAPE RECORD IF END OF FILE GO TO ZP.
 062000 IF DOONO NEQ DOCNWS GO TO ZP.
 063000 MOVE DTERM TO STERM 1 .
 064000 EXIT LA.
 065000 XB. READ DOCTAPE RECORD IF END OF FILE GO TO ZP.
 066000 IF DOONO EQ DOCNWS GO TO XB.
 067000 ZP. J I - 1.
 068000 MATCHES 0.
 069000 ZO. NBGS 1.
 070000 LEVELS 1.
 071000 WBIGHTS 0.
 072000 LEVS 0.
 073000 MOVE ZEROS TO TOTWT.
 074000 ZO. VARY B FROM 1 BY 1 UNTIL B IS GREATER THAN J.
 075000 IF PTBRM EQ STERM 1 GO TO ZS.
 076000 EXIT ZO.
 077000 GO TO ZE.
 078000 ZS. LBVS 1.
 079000 IF WBIGHT EQ 000 GO TO ZK.
 080000 IF WBIGHTS GO TO ZE.
 081000 TOTWT TOTWT & WBIGHT.
 082000 IF TOTWT US 999 GO TO ZE.
 083000 WEIGHTS 1.
 084000 ZE. IF LEVEL EQ LEVELWS GO TO ZG.
 085000 IF LEVS GO TO ZL.
 086000 LBVELS 0.
 087000 ZP. MOVE LLEVEL TO LEVELWS.
 088000 ZG. READ RROTAPE RECORD IF END OF FILE GO TO ZH.
 089000 IF SUBNO EQ SUBNWS GO TO ZM.
 090000 ZH. IF LEVELS AND WEIGHTS AND NEGS GO TO ZQ.
 091000 GO TO ZI.
 092000 ZQ. IF MATCHES GO TO ZI.
 093000 MATCHES 1.
 094000 WRITE NOTICE RECORD.
 095000 COPIES COPIES & 1.
 096000 ZI. IF END OF FILE OF PROTAPE GO TO ZN.
 097000 IF SUBNO EQ SUBNWS GO TO ZJ.
 098000 MOVE SUBNO TO SUBNWS.
 099000 MATCHES 0.
 100000 ZJ. MOVE RRONO TO PRONWS.
 101000 MOVE LLEVEL TO LEVELWS.
 102000 GO TO ZC.
 103000 ZK. NBGS 0.
 104000 GO TO ZE.
 105000 ZL. LBVS 0.
 106000 GO TO ZF.

107000 ZM. IF PRONO EQ PRONOWS GO TO ZD.
108000 GO TO ZH.
109000 ZN. CLOSE PROTAPE WITH NO LOCK NO REWIND.
120000 WRITE DUPBORDER RECORD.
121000 IF NOT END OF FILE OF DOCTAPE GO TO ZB.
122000 CUOSE DOCTAPE.
122500 CUOSE CARDSOUT.
123000 STOP RUN #MATCH#.
124000 END PROGRAM.

MATCH PROGRAM



Security Classification

DOCUMENT CONTROL DATA - R&D		
<small>(Security classification of title, body of abstract and indexing annotation must be entered when the overall report is classified)</small>		
1. ORIGINATING ACTIVITY <small>(Corporate author)</small> INFORMATION DYNAMICS CORPORATION 80 Main Street Reading, Massachusetts 01867		2a. REPORT SECURITY CLASSIFICATION UNCLASSIFIED
		2b. GROUP NA
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4. DESCRIPTIVE NOTES <small>(Type of report and inclusive dates)</small> Final Report		
5. AUTHOR(S) <small>(Last name, first name, initial)</small> Bivona, William A.		
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11. SUPPLEMENTARY NOTES This report was prepared for the Army Technical Library Improvement Studies (ATLIS) Program		12. SPONSORING MILITARY ACTIVITY U. S. Army Natick Laboratories Natick, Massachusetts
13. ABSTRACT This document is a manual and set of guidelines for implementing and operating a replica of a prototype SDI system tested at U. S. Army Natick Laboratories. A complete description of the features of the SDI system and a history of the pilot test are given in Volume I of this final report entitled, <u>Selective Dissemination of Information (SDI), Volume I, Pilot Test at U. S. Army Natick Laboratories.</u> Volume II supplies information which is especially useful in the initial stages of implementation. It discusses the application of specific criteria for selecting an initial set of participants in the SDI program and gives guidelines for analyzing document input, indexing vocabulary and internally and externally produced machine-readable records that might be used as preferential or additional input. Two sections of the manual are devoted to giving specific directions to library and data processing personnel which are necessary for operation of the SDI system.		

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Security Classification

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Documentation						
Distribution						
Bibliographies						
Programming (Computers)						
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